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(54) Title: COMPOSITIONS AND METHODS FOR THERAPY AND DIAGNOSIS OF PROSTATE CANCER

(57) Abstract

Compositions and methods for the therapy and diagnosis of cancer, such as prostate cancer, are disclosed. Compositions may comprise one or more prostate tumor proteins, immunogenic portions thereof, or polynucleotides that encode such portions. Alternatively, a therapeutic composition may comprise an antigen presenting cell that expresses a prostate tumor protein, or a T cell that is specific for cells expressing such a protein. Such compositions may be used, for example, for the prevention and treatment of diseases such as prostate cancer. Diagnostic methods based on detecting a prostate tumor protein, or mRNA encoding such a protein, in a sample are also provided.

COMPOSITIONS AND METHODS FOR THERAPY AND DIAGNOSIS OF PROSTATE CANCER

TECHNICAL FIELD

The present invention relates generally to therapy and diagnosis of cancer, such as prostate cancer. The invention is more specifically related to polypeptides comprising at least a portion of a prostate tumor protein, and to polynucleotides encoding such polypeptides. Such polypeptides and polynucleotides may be used in vaccines and pharmaceutical compositions for prevention and treatment of prostate cancer, and for the diagnosis and monitoring of such cancers.

BACKGROUND OF THE INVENTION

Prostate cancer is the most common form of cancer among males, with an estimated incidence of 30% in men over the age of 50. Overwhelming clinical evidence shows that human prostate cancer has the propensity to metastasize to bone, and the disease appears to progress inevitably from androgen dependent to androgen refractory status, leading to increased patient mortality. This prevalent disease is currently the second leading cause of cancer death among men in the U.S.

In spite of considerable research into therapies for the disease, prostate cancer remains difficult to treat. Commonly, treatment is based on surgery and/or radiation therapy, but these methods are ineffective in a significant percentage of cases. Two previously identified prostate specific proteins - prostate specific antigen (PSA) and prostatic acid phosphatase (PAP) - have limited therapeutic and diagnostic potential. For example, PSA levels do not always correlate well with the presence of prostate cancer, being positive in a percentage of non-prostate cancer cases, including benign prostatic hyperplasia (BPH). Furthermore, PSA measurements correlate with prostate volume, and do not indicate the level of metastasis.

In spite of considerable research into therapies for these and other cancers, prostate cancer remains difficult to diagnose and treat effectively. Accordingly, there is a need in the art for improved methods for detecting and treating such cancers. The present invention fulfills these needs and further provides other related advantages.

SUMMARY OF THE INVENTION

Briefly stated, the present invention provides compositions and methods for the diagnosis and therapy of cancer, such as prostate cancer. In one aspect, the present

invention provides polypeptides comprising at least a portion of a prostate tumor protein, or a variant thereof. Certain portions and other variants are immunogenic, such that the ability of the variant to react with antigen-specific antisera is not substantially diminished. Within certain embodiments, the polypeptide comprises at least an immunogenic portion of a prostate tumor protein, or a variant thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of: (a) sequences recited in any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472; (b) sequences that hybridize to any of the foregoing sequences under moderately stringent conditions; and (c) complements of any of the sequence of (a) or (b). In certain specific embodiments, such a polypeptide comprises at least a portion, or variant thereof, of a tumor protein that includes an amino acid sequence selected from the group consisting of sequences recited in any one of SEQ ID NO: 112-114, 172, 176, 178, 327, 329, 331, 336, 339, 376-380 and 383.

The present invention further provides polynucleotides that encode a polypeptide as described above, or a portion thereof (such as a portion encoding at least 15 amino acid residues of a prostate tumor protein), expression vectors comprising such polynucleotides and host cells transformed or transfected with such expression vectors.

Within other aspects, the present invention provides pharmaceutical compositions comprising a polypeptide or polynucleotide as described above and a physiologically acceptable carrier.

Within a related aspect of the present invention, vaccines are provided. Such vaccines comprise a polypeptide or polynucleotide as described above and a non-specific immune response enhancer.

The present invention further provides pharmaceutical compositions that comprise: (a) an antibody or antigen-binding fragment thereof that specifically binds to a prostate tumor protein; and (b) a physiologically acceptable carrier.

Within further aspects, the present invention provides pharmaceutical compositions comprising: (a) an antigen presenting cell that expresses a polypeptide as described above and (b) a pharmaceutically acceptable carrier or excipient. Antigen presenting cells include dendritic cells, macrophages, monocytes, fibroblasts and B cells.

Within related aspects, vaccines are provided that comprise: (a) an antigen presenting cell that expresses a polypeptide as described above and (b) a non-specific immune response enhancer.

The present invention further provides, in other aspects, fusion proteins that comprise at least one polypeptide as described above, as well as polynucleotides encoding such fusion proteins.

Within related aspects, pharmaceutical compositions comprising a fusion protein, or a polynucleotide encoding a fusion protein, in combination with a physiologically acceptable carrier are provided.

Vaccines are further provided, within other aspects, that comprise a fusion protein, or a polynucleotide encoding a fusion protein, in combination with a non-specific immune response enhancer.

Within further aspects, the present invention provides methods for inhibiting the development of a cancer in a patient, comprising administering to a patient a pharmaceutical composition or vaccine as recited above.

The present invention further provides, within other aspects, methods for removing tumor cells from a biological sample, comprising contacting a biological sample with T cells that specifically react with a prostate tumor protein, wherein the step of contacting is performed under conditions and for a time sufficient to permit the removal of cells expressing the protein from the sample.

Within related aspects, methods are provided for inhibiting the development of a cancer in a patient, comprising administering to a patient a biological sample treated as described above.

Methods are further provided, within other aspects, for stimulating and/or expanding T cells specific for a prostate tumor protein, comprising contacting T cells with one or more of: (i) a polypeptide as described above; (ii) a polynucleotide encoding such a polypeptide; and/or (iii) an antigen presenting cell that expresses such a polypeptide; under conditions and for a time sufficient to permit the stimulation and/or expansion of T cells. Isolated T cell populations comprising T cells prepared as described above are also provided.

Within further aspects, the present invention provides methods for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a T cell population as described above.

The present invention further provides methods for inhibiting the development of a cancer in a patient, comprising the steps of: (a) incubating $CD4^+$ and/or $CD8^+$ T cells isolated from a patient with one or more of: (i) a polypeptide comprising at least an immunogenic portion of a prostate tumor protein; (ii) a polynucleotide encoding such a polypeptide; and (iii) an antigen-presenting cell that expressed such a polypeptide; and (b) administering to the patient an effective amount of the proliferated T-cells, and thereby inhibiting the development of a cancer in the patient. Proliferated cells may, but need not, be cloned prior to administration to the patient.

Within further aspects, the present invention provides methods for determining the presence or absence of a cancer in a patient, comprising: (a) contacting a biological sample obtained from a patient with a binding agent that binds to a polypeptide as recited

above; (b) detecting in the sample an amount of polypeptide that binds to the binding agent; and (c) comparing the amount of polypeptide with a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient. Within preferred embodiments, the binding agent is an antibody, more preferably a monoclonal antibody. The cancer may be prostate cancer.

The present invention also provides, within other aspects, methods for monitoring the progression of a cancer in a patient. Such methods comprise the steps of: (a) contacting a biological sample obtained from a patient at a first point in time with a binding agent that binds to a polypeptide as recited above; (b) detecting in the sample an amount of polypeptide that binds to the binding agent; (c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and (d) comparing the amount of polypeptide detected in step (c) with the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

The present invention further provides, within other aspects, methods for determining the presence or absence of a cancer in a patient, comprising the steps of: (a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a prostate tumor protein; (b) detecting in the sample a level of a polynucleotide, preferably mRNA, that hybridizes to the oligonucleotide; and (c) comparing the level of polynucleotide that hybridizes to the oligonucleotide with a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient. Within certain embodiments, the amount of mRNA is detected via polymerase chain reaction using, for example, at least one oligonucleotide primer that hybridizes to a polynucleotide encoding a polypeptide as recited above, or a complement of such a polynucleotide. Within other embodiments, the amount of mRNA is detected using a hybridization technique, employing an oligonucleotide probe that hybridizes to a polynucleotide that encodes a polypeptide as recited above, or a complement of such a polynucleotide.

In related aspects, methods are provided for monitoring the progression of a cancer in a patient, comprising the steps of: (a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a prostate tumor protein; (b) detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide; (c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and (d) comparing the amount of polynucleotide detected in step (c) with the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

Within further aspects, the present invention provides antibodies, such as monoclonal antibodies, that bind to a polypeptide as described above, as well as diagnostic

kits comprising such antibodies. Diagnostic kits comprising one or more oligonucleotide probes or primers as described above are also provided.

These and other aspects of the present invention will become apparent upon reference to the following detailed description and attached drawings. All references disclosed herein are hereby incorporated by reference in their entirety as if each was incorporated individually.

BRIEF DESCRIPTION OF THE DRAWINGS AND SEQUENCE IDENTIFIERS

Figure 1 illustrates the ability of T cells to kill fibroblasts expressing the representative prostate tumor polypeptide P502S, as compared to control fibroblasts. The percentage lysis is shown as a series of effector:target ratios, as indicated.

Figures 2A and 2B illustrate the ability of T cells to recognize cells expressing the representative prostate tumor polypeptide P502S. In each case, the number of γ-interferon spots is shown for different numbers of responders. In Figure 2A, data is presented for fibroblasts pulsed with the P2S-12 peptide, as compared to fibroblasts pulsed with a control E75 peptide. In Figure 2B, data is presented for fibroblasts expressing P502S, as compared to fibroblasts expressing HER-2/neu.

Figure 3 represents a peptide competition binding assay showing that the P1S#10 peptide, derived from P501S, binds HLA-A2. Peptide P1S#10 inhibits HLA-A2 restricted presentation of fluM58 peptide to CTL clone D150M58 in TNF release bioassay. D150M58 CTL is specific for the HLA-A2 binding influenza matrix peptide fluM58.

Figure 4 illustrates the ability of T cell lines generated from P1S#10 immunized mice to specifically lyse P1S#10-pulsed Jurkat A2Kb targets and P501S-transduced Jurkat A2Kb targets, as compared to EGFP-transduced Jurkat A2Kb. The percent lysis is shown as a series of effector to target ratios, as indicated.

Figure 5 illustrates the ability of a T cell clone to recognize and specifically lyse Jurkat A2Kb cells expressing the representative prostate tumor polypeptide P501S, thereby demonstrating that the P1S#10 peptide may be a naturally processed epitope of the P501S polypeptide.

Figures 6A and 6B are graphs illustrating the specificity of a CD8+ cell line (3A-1) for a representative prostate tumor antigen (P501S). Figure 6A shows the results of a ^{51}Cr release assay. The percent specific lysis is shown as a series of effector:target ratios, as indicated. Figure 6B shows the production of interferon-gamma by 3A-1 cells stimulated with autologous B-LCL transduced with P501S, at varying effector:target rations as indicated.

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SEQ ID NO: 255 is the determined cDNA sequence for JPTPN88

SEQ ID NO: 256 is the determined cDNA sequence for JP1F1

SEQ ID NO: 257 is the determined cDNA sequence for JP1F2

SEQ ID NO: 258 is the determined cDNA sequence for JP1C2

SEQ ID NO: 259 is the determined cDNA sequence for JP1B1

SEQ ID NO: 260 is the determined cDNA sequence for JP1B2

SEQ ID NO: 261 is the determined cDNA sequence for JP1D3
SEQ ID NO: 262 is the determined cDNA sequence for JP1A4
SEQ ID NO: 263 is the determined cDNA sequence for JP1F5
SEQ ID NO: 264 is the determined cDNA sequence for JP1E6
SEQ ID NO: 265 is the determined cDNA sequence for JP1D6
SEQ ID NO: 266 is the determined cDNA sequence for JP1B5
SEQ ID NO: 267 is the determined cDNA sequence for JP1A6
SEQ ID NO: 268 is the determined cDNA sequence for JP1E8
SEQ ID NO: 269 is the determined cDNA sequence for JP1D7
SEQ ID NO: 270 is the determined cDNA sequence for JP1D9
SEQ ID NO: 271 is the determined cDNA sequence for JP1C10
SEQ ID NO: 272 is the determined cDNA sequence for JP1A9
SEQ ID NO: 273 is the determined cDNA sequence for JP1F12
SEQ ID NO: 274 is the determined cDNA sequence for JP1E12
SEQ ID NO: 275 is the determined cDNA sequence for JP1D11
SEQ ID NO: 276 is the determined cDNA sequence for JP1C11
SEQ ID NO: 277 is the determined cDNA sequence for JP1C12
SEQ ID NO: 278 is the determined cDNA sequence for JP1B12
SEQ ID NO: 279 is the determined cDNA sequence for JP1A12
SEQ ID NO: 280 is the determined cDNA sequence for JP8G2
SEQ ID NO: 281 is the determined cDNA sequence for JP8H1
SEQ ID NO: 282 is the determined cDNA sequence for JP8H2
SEQ ID NO: 283 is the determined cDNA sequence for JP8A3
SEQ ID NO: 284 is the determined cDNA sequence for JP8A4
SEQ ID NO: 285 is the determined cDNA sequence for JP8C3
SEQ ID NO: 286 is the determined cDNA sequence for JP8G4
SEQ ID NO: 287 is the determined cDNA sequence for JP8B6
SEQ ID NO: 288 is the determined cDNA sequence for JP8D6
SEQ ID NO: 289 is the determined cDNA sequence for JP8F5
SEQ ID NO: 290 is the determined cDNA sequence for JP8A8
SEQ ID NO: 291 is the determined cDNA sequence for JP8C7
SEQ ID NO: 292 is the determined cDNA sequence for JP8D7
SEQ ID NO: 293 is the determined cDNA sequence for P8D8
SEQ ID NO: 294 is the determined cDNA sequence for JP8E7
SEQ ID NO: 295 is the determined cDNA sequence for JP8F8
SEQ ID NO: 296 is the determined cDNA sequence for JP8G8
SEQ ID NO: 297 is the determined cDNA sequence for JP8B10

SEQ ID NO: 298 is the determined cDNA sequence for JP8C10

SEQ ID NO: 299 is the determined cDNA sequence for JP8E9

SEQ ID NO: 300 is the determined cDNA sequence for JP8E10

SEQ ID NO: 301 is the determined cDNA sequence for JP8F9

SEQ ID NO: 302 is the determined cDNA sequence for JP8H9

SEQ ID NO: 303 is the determined cDNA sequence for JP8C12

SEQ ID NO: 304 is the determined cDNA sequence for JP8E11

SEQ ID NO: 305 is the determined cDNA sequence for JP8E12

SEQ ID NO: 306 is the amino acid sequence for the peptide PS2#12

SEQ ID NO: 307 is the determined cDNA sequence for P711P

SEQ ID NO: 308 is the determined cDNA sequence for P712P

SEQ ID NO: 309 is the determined cDNA sequence for CLONE23

SEQ ID NO: 310 is the determined cDNA sequence for P774P

SEQ ID NO: 311 is the determined cDNA sequence for P775P

SEQ ID NO: 312 is the determined cDNA sequence for P715P

SEQ ID NO: 313 is the determined cDNA sequence for P710P

SEQ ID NO: 314 is the determined cDNA sequence for P767P

SEQ ID NO: 315 is the determined cDNA sequence for P768P

SEQ ID NO: 316-325 are the determined cDNA sequences of previously isolated genes

SEQ ID NO: 326 is the determined cDNA sequence for P703PDE5

SEQ ID NO: 327 is the predicted amino acid sequence for P703PDE5

SEQ ID NO: 328 is the determined cDNA sequence for P703P6.26

SEQ ID NO: 329 is the predicted amino acid sequence for P703P6.26

SEQ ID NO: 330 is the determined cDNA sequence for P703PX-23

SEQ ID NO: 331 is the predicted amino acid sequence for P703PX-23

SEQ ID NO: 332 is the determined full length cDNA sequence for P509S

SEQ ID NO: 333 is the determined extended cDNA sequence for P707P (also referred to as 11-C9)

SEQ ID NO: 334 is the determined cDNA sequence for P714P

SEQ ID NO: 335 is the determined cDNA sequence for P705P (also referred to as 9-F3)

SEQ ID NO: 336 is the predicted amino acid sequence for P705P

SEQ ID NO: 337 is the amino acid sequence of the peptide P1S#10

SEQ ID NO: 338 is the amino acid sequence of the peptide p5

SEQ ID NO: 339 is the predicted amino acid sequence of P509S

SEQ ID NO: 340 is the determined cDNA sequence for P778P

SEQ ID NO: 341 is the determined cDNA sequence for P786P

SEQ ID NO: 342 is the determined cDNA sequence for P789P

SEQ ID NO: 343 is the determined cDNA sequence for a clone showing homology to Homo sapiens MM46 mRNA

SEQ ID NO: 344 is the determined cDNA sequence for a clone showing homology to Homo sapiens TNF-alpha stimulated ABC protein (ABC50) mRNA

SEQ ID NO: 345 is the determined cDNA sequence for a clone showing homology to Homo sapiens mRNA for E-cadherin

SEQ ID NO: 346 is the determined cDNA sequence for a clone showing homology to Human nuclear-encoded mitochondrial serine hydroxymethyltransferase (SHMT)

SEQ ID NO: 347 is the determined cDNA sequence for a clone showing homology to Homo sapiens natural resistance-associated macrophage protein2 (NRAMP2)

SEQ ID NO: 348 is the determined cDNA sequence for a clone showing homology to Homo sapiens phosphoglucomutase-related protein (PGMRP)

SEQ ID NO: 349 is the determined cDNA sequence for a clone showing homology to Human mRNA for proteosome subunit p40

SEQ ID NO: 350 is the determined cDNA sequence for P777P

SEQ ID NO: 351 is the determined cDNA sequence for P779P

SEQ ID NO: 352 is the determined cDNA sequence for P790P

SEQ ID NO: 353 is the determined cDNA sequence for P784P

SEQ ID NO: 354 is the determined cDNA sequence for P776P

SEQ ID NO: 355 is the determined cDNA sequence for P780P

SEQ ID NO: 356 is the determined cDNA sequence for P544S

SEQ ID NO: 357 is the determined cDNA sequence for P745S

SEQ ID NO: 358 is the determined cDNA sequence for P782P

SEQ ID NO: 359 is the determined cDNA sequence for P783P

SEQ ID NO: 360 is the determined cDNA sequence for unknown 17984

SEQ ID NO: 361 is the determined cDNA sequence for P787P

SEQ ID NO: 362 is the determined cDNA sequence for P788P

SEQ ID NO: 363 is the determined cDNA sequence for unknown 17994

SEQ ID NO: 364 is the determined cDNA sequence for P781P

SEQ ID NO: 365 is the determined cDNA sequence for P785P

SEQ ID NO: 366-375 are the determined cDNA sequences for splice variants of B305D.

SEQ ID NO: 376 is the predicted amino acid sequence encoded by the sequence of SEQ ID NO: 366.

SEQ ID NO: 377 is the predicted amino acid sequence encoded by the sequence of SEQ ID NO: 372.

SEQ ID NO: 378 is the predicted amino acid sequence encoded by the sequence of SEQ ID NO: 373.

SEQ ID NO: 379 is the predicted amino acid sequence encoded by the sequence of SEQ ID NO: 374.

SEQ ID NO: 380 is the predicted amino acid sequence encoded by the sequence of SEQ ID NO: 375.

SEQ ID NO: 381 is the determined cDNA sequence for B716P.

SEQ ID NO: 382 is the determined full-length cDNA sequence for P711P.

SEQ ID NO: 383 is the predicted amino acid sequence for P711P.

SEQ ID NO: 384 is the cDNA sequence for P1000C.

SEQ ID NO: 385 is the cDNA sequence for CGI-82.

SEQ ID NO:386 is the cDNA sequence for 23320.

SEQ ID NO:387 is the cDNA sequence for CGI-69.

SEQ ID NO:388 is the cDNA sequence for L-iditol-2-dehydrogenase.

SEQ ID NO:389 is the cDNA sequence for 23379.

SEQ ID NO:390 is the cDNA sequence for 23381.

SEQ ID NO:391 is the cDNA sequence for KIAA0122.

SEQ ID NO:392 is the cDNA sequence for 23399.

SEQ ID NO:393 is the cDNA sequence for a previously identified gene.

SEQ ID NO:394 is the cDNA sequence for HCLBP.

SEQ ID NO:395 is the cDNA sequence for transglutaminase.

SEQ ID NO:396 is the cDNA sequence for a previously identified gene.

SEQ ID NO:397 is the cDNA sequence for PAP.

SEQ ID NO:398 is the cDNA sequence for Ets transcription factor PDEF.

SEQ ID NO:399 is the cDNA sequence for hTGR.

SEQ ID NO:400 is the cDNA sequence for KIAA0295.

SEQ ID NO:401 is the cDNA sequence for 22545.

SEQ ID NO:402 is the cDNA sequence for 22547.

SEQ ID NO:403 is the cDNA sequence for 22548.

SEQ ID NO:404 is the cDNA sequence for 22550.

SEQ ID NO:405 is the cDNA sequence for 22551.

SEQ ID NO:406 is the cDNA sequence for 22552.

SEQ ID NO:407 is the cDNA sequence for 22553.

SEQ ID NO:408 is the cDNA sequence for 22558.

SEQ ID NO:409 is the cDNA sequence for 22562.

SEQ ID NO:410 is the cDNA sequence for 22565.

SEQ ID NO:411 is the cDNA sequence for 22567.

SEQ ID NO:412 is the cDNA sequence for 22568.

SEQ ID NO:413 is the cDNA sequence for 22570.

SEQ ID NO:414 is the cDNA sequence for 22571.

SEQ ID NO:415 is the cDNA sequence for 22572.

SEQ ID NO:416 is the cDNA sequence for 22573.

SEQ ID NO:417 is the cDNA sequence for 22573.

SEQ ID NO:418 is the cDNA sequence for 22575.

SEQ ID NO:419 is the cDNA sequence for 22580.

SEQ ID NO:420 is the cDNA sequence for 22581.

SEQ ID NO:421 is the cDNA sequence for 22582.

SEQ ID NO:422 is the cDNA sequence for 22583.

SEQ ID NO:423 is the cDNA sequence for 22584.

SEQ ID NO:424 is the cDNA sequence for 22585.

SEQ ID NO:425 is the cDNA sequence for 22586.

SEQ ID NO:426 is the cDNA sequence for 22587.

SEQ ID NO:427 is the cDNA sequence for 22588.

SEQ ID NO:428 is the cDNA sequence for 22589.

SEQ ID NO:429 is the cDNA sequence for 22590.

SEQ ID NO:430 is the cDNA sequence for 22591.

SEQ ID NO:431 is the cDNA sequence for 22592.

SEQ ID NO:432 is the cDNA sequence for 22593.

SEQ ID NO:433 is the cDNA sequence for 22594.

SEQ ID NO:434 is the cDNA sequence for 22595.

SEQ ID NO:435 is the cDNA sequence for 22596.

SEQ ID NO:436 is the cDNA sequence for 22847.

SEQ ID NO:437 is the cDNA sequence for 22848.

SEQ ID NO:438 is the cDNA sequence for 22849.

SEQ ID NO:439 is the cDNA sequence for 22851.

SEQ ID NO:440 is the cDNA sequence for 22852.

SEQ ID NO:441 is the cDNA sequence for 22853.

SEQ ID NO:442 is the cDNA sequence for 22854.

SEQ ID NO:443 is the cDNA sequence for 22855.

SEQ ID NO:444 is the cDNA sequence for 22856.

SEQ ID NO:445 is the cDNA sequence for 22857.

SEQ ID NO:446 is the cDNA sequence for 23601.

SEQ ID NO:447 is the cDNA sequence for 23602.

SEQ ID NO:448 is the cDNA sequence for 23605.

SEQ ID NO:449 is the cDNA sequence for 23606.

SEQ ID NO:450 is the cDNA sequence for 23612.

SEQ ID NO:451 is the cDNA sequence for 23614.

SEQ ID NO:452 is the cDNA sequence for 23618.

SEQ ID NO:453 is the cDNA sequence for 23622.

SEQ ID NO:454 is the cDNA sequence for folate hydrolase.

SEQ ID NO:455 is the cDNA sequence for LIM protein.

SEQ ID NO:456 is the cDNA sequence for a known gene.

SEQ ID NO:457 is the cDNA sequence for a known gene.

SEQ ID NO:458 is the cDNA sequence for a previously identified gene.

SEQ ID NO:459 is the cDNA sequence for 23045.

SEQ ID NO:460 is the cDNA sequence for 23032.

SEQ ID NO:461 is the cDNA sequence for 23054.

SEQ ID NOs:462–467 are cDNA sequences for known genes.

SEQ ID NOs:468–471 are cDNA sequences for P710P.

SEQ ID NO:472 is a cDNA sequence for P1001C.

DETAILED DESCRIPTION OF THE INVENTION

As noted above, the present invention is generally directed to compositions and methods for the therapy and diagnosis of cancer, such as prostate cancer. The compositions described herein may include prostate tumor polypeptides, polynucleotides encoding such polypeptides, binding agents such as antibodies, antigen presenting cells (APCs) and/or immune system cells (e.g., T cells). Polypeptides of the present invention generally comprise at least a portion (such as an immunogenic portion) of a prostate tumor protein or a variant thereof. A "prostate tumor protein" is a protein that is expressed in prostate tumor cells at a level that is at least two fold, and preferably at least five fold, greater than the level of expression in a normal tissue, as determined using a representative assay provided herein. Certain prostate tumor proteins are tumor proteins that react detectably (within an immunoassay, such as an ELISA or Western blot) with antisera of a patient afflicted with prostate cancer. Polynucleotides of the subject invention generally comprise a DNA or RNA sequence that encodes all or a portion of such a polypeptide, or that is complementary to such a sequence. Antibodies are generally immune system proteins, or antigen-binding fragments thereof, that are capable of binding to a polypeptide as described above. Antigen presenting cells include dendritic cells, macrophages, monocytes, fibroblasts and B-cells that express a polypeptide as described above. T cells that may be employed within such compositions are generally T cells that are specific for a polypeptide as described above.

The present invention is based on the discovery of human prostate tumor proteins. Sequences of polynucleotides encoding certain tumor proteins, or portions thereof, are provided in SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472. Sequences of polypeptides comprising at least a portion of a tumor protein are provided in SEQ ID NOs:112-114, 172, 176, 178, 327, 329, 331, 336, 339, 376-380 and 383.

PROSTATE TUMOR PROTEIN POLYNUCLEOTIDES

Any polynucleotide that encodes a prostate tumor protein or a portion or other variant thereof as described herein is encompassed by the present invention. Preferred polynucleotides comprise at least 15 consecutive nucleotides, preferably at least 30 consecutive nucleotides and more preferably at least 45 consecutive nucleotides, that encode a portion of a prostate tumor protein. More preferably, a polynucleotide encodes an immunogenic portion of a prostate tumor protein. Polynucleotides complementary to any such sequences are also encompassed by the present invention. Polynucleotides may be single-stranded (coding or antisense) or double-stranded, and may be DNA (genomic, cDNA or synthetic) or RNA molecules. RNA molecules include HnRNA molecules, which contain introns and correspond to a DNA molecule in a one-to-one manner, and mRNA molecules, which do not contain introns. Additional coding or non-coding sequences may, but need not, be present within a polynucleotide of the present invention, and a polynucleotide may, but need not, be linked to other molecules and/or support materials.

Polynucleotides may comprise a native sequence (i.e., an endogenous sequence that encodes a prostate tumor protein or a portion thereof) or may comprise a variant of such a sequence. Polynucleotide variants may contain one or more substitutions, additions, deletions and/or insertions such that the immunogenicity of the encoded polypeptide is not diminished, relative to a native tumor protein. The effect on the immunogenicity of the encoded polypeptide may generally be assessed as described herein. Variants preferably exhibit at least about 70% identity, more preferably at least about 80% identity and most preferably at least about 90% identity to a polynucleotide sequence that encodes a native prostate tumor protein or a portion thereof.

Two polynucleotide or polypeptide sequences are said to be "identical" if the sequence of nucleotides or amino acids in the two sequences is the same when aligned for maximum correspondence as described below. Comparisons between two sequences are typically performed by comparing the sequences over a comparison window to identify and compare local regions of sequence similarity. A "comparison window" as used herein, refers to a segment of at least about 20 contiguous positions, usually 30 to about 75, 40 to about 50,

in which a sequence may be compared to a reference sequence of the same number of contiguous positions after the two sequences are optimally aligned.

Optimal alignment of sequences for comparison may be conducted using the Megalign program in the Lasergene suite of bioinformatics software (DNASTAR, Inc., Madison, WI), using default parameters. This program embodies several alignment schemes described in the following references: Dayhoff, M.O. (1978) A model of evolutionary change in proteins – Matrices for detecting distant relationships. In Dayhoff, M.O. (ed.) Atlas of Protein Sequence and Structure, National Biomedical Research Foundation, Washington DC Vol. 5, Suppl. 3, pp. 345-358; Hein J. (1990) Unified Approach to Alignment and Phylogenes pp. 626-645 *Methods in Enzymology* vol. 183, Academic Press, Inc., San Diego, CA; Higgins, D.G. and Sharp, P.M. (1989) *CABIOS* 5:151-153; Myers, E.W. and Muller W. (1988) *CABIOS* 4:11-17; Robinson, E.D. (1971) *Comb. Theor 11*:105; Santou, N. Nes, M. (1987) *Mol. Biol. Evol. 4*:406-425; Sneath, P.H.A. and Sokal, R.R. (1973) *Numerical Taxonomy – the Principles and Practice of Numerical Taxonomy*, Freeman Press, San Francisco, CA; Wilbur, W.J. and Lipman, D.J. (1983) *Proc. Natl. Acad., Sci. USA 80*:726-730.

Preferably, the "percentage of sequence identity" is determined by comparing two optimally aligned sequences over a window of comparison of at least 20 positions, wherein the portion of the polynucleotide or polypeptide sequence in the comparison window may comprise additions or deletions (*i.e.*, gaps) of 20 percent or less, usually 5 to 15 percent, or 10 to 12 percent, as compared to the reference sequences (which does not comprise additions or deletions) for optimal alignment of the two sequences. The percentage is calculated by determining the number of positions at which the identical nucleic acid bases or amino acid residue occurs in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the reference sequence (*i.e.*, the window size) and multiplying the results by 100 to yield the percentage of sequence identity.

Variants may also, or alternatively, be substantially homologous to a native gene, or a portion or complement thereof. Such polynucleotide variants are capable of hybridizing under moderately stringent conditions to a naturally occurring DNA sequence encoding a native prostate tumor protein (or a complementary sequence). Suitable moderately stringent conditions include prewashing in a solution of 5 X SSC, 0.5% SDS, 1.0 mM EDTA (pH 8.0); hybridizing at 50°C-65°C, 5 X SSC, overnight; followed by washing twice at 65°C for 20 minutes with each of 2X, 0.5X and 0.2X SSC containing 0.1% SDS.

It will be appreciated by those of ordinary skill in the art that, as a result of the degeneracy of the genetic code, there are many nucleotide sequences that encode a polypeptide as described herein. Some of these polynucleotides bear minimal homology to

the nucleotide sequence of any native gene. Nonetheless, polynucleotides that vary due to differences in codon usage are specifically contemplated by the present invention. Further, alleles of the genes comprising the polynucleotide sequences provided herein are within the scope of the present invention. Alleles are endogenous genes that are altered as a result of one or more mutations, such as deletions, additions and/or substitutions of nucleotides. The resulting mRNA and protein may, but need not, have an altered structure or function. Alleles may be identified using standard techniques (such as hybridization, amplification and/or database sequence comparison).

Polynucleotides may be prepared using any of a variety of techniques. For example, a polynucleotide may be identified, as described in more detail below, by screening a microarray of cDNAs for tumor-associated expression (*i.e.*, expression that is at least five fold greater in a prostate tumor than in normal tissue, as determined using a representative assay provided herein). Such screens may be performed using a Synteni microarray (Palo Alto, CA) according to the manufacturer's instructions (and essentially as described by Schena et al., *Proc. Natl. Acad. Sci. USA 93*:10614-10619, 1996 and Heller et al., *Proc. Natl. Acad. Sci. USA 94*:2150-2155, 1997). Alternatively, polypeptides may be amplified from cDNA prepared from cells expressing the proteins described herein, such as prostate tumor cells. Such polynucleotides may be amplified via polymerase chain reaction (PCR). For this approach, sequence-specific primers may be designed based on the sequences provided herein, and may be purchased or synthesized.

An amplified portion may be used to isolate a full length gene from a suitable library (*e.g.*, a prostate tumor cDNA library) using well known techniques. Within such techniques, a library (cDNA or genomic) is screened using one or more polynucleotide probes or primers suitable for amplification. Preferably, a library is size-selected to include larger molecules. Random primed libraries may also be preferred for identifying 5' and upstream regions of genes. Genomic libraries are preferred for obtaining introns and extending 5' sequences.

For hybridization techniques, a partial sequence may be labeled (*e.g.*, by nick-translation or end-labeling with ^{32}P) using well known techniques. A bacterial or bacteriophage library is then screened by hybridizing filters containing denatured bacterial colonies (or lawns containing phage plaques) with the labeled probe (*see* Sambrook et al., *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratories, Cold Spring Harbor, NY, 1989). Hybridizing colonies or plaques are selected and expanded, and the DNA is isolated for further analysis. cDNA clones may be analyzed to determine the amount of additional sequence by, for example, PCR using a primer from the partial sequence and a primer from the vector. Restriction maps and partial sequences may be generated to identify one or more overlapping clones. The complete sequence may then be determined using

standard techniques, which may involve generating a series of deletion clones. The resulting overlapping sequences are then assembled into a single contiguous sequence. A full length cDNA molecule can be generated by ligating suitable fragments, using well known techniques.

Alternatively, there are numerous amplification techniques for obtaining a full length coding sequence from a partial cDNA sequence. Within such techniques, amplification is generally performed via PCR. Any of a variety of commercially available kits may be used to perform the amplification step. Primers may be designed using, for example, software well known in the art. Primers are preferably 22-30 nucleotides in length, have a GC content of at least 50% and anneal to the target sequence at temperatures of about 68°C to 72°C. The amplified region may be sequenced as described above, and overlapping sequences assembled into a contiguous sequence.

One such amplification technique is inverse PCR (see Triglia et al., *Nucl. Acids Res. 16*:8186, 1988), which uses restriction enzymes to generate a fragment in the known region of the gene. The fragment is then circularized by intramolecular ligation and used as a template for PCR with divergent primers derived from the known region. Within an alternative approach, sequences adjacent to a partial sequence may be retrieved by amplification with a primer to a linker sequence and a primer specific to a known region. The amplified sequences are typically subjected to a second round of amplification with the same linker primer and a second primer specific to the known region. A variation on this procedure, which employs two primers that initiate extension in opposite directions from the known sequence, is described in WO 96/38591. Another such technique is known as "rapid amplification of cDNA ends" or RACE. This technique involves the use of an internal primer and an external primer, which hybridizes to a polyA region or vector sequence, to identify sequences that are 5' and 3' of a known sequence. Additional techniques include capture PCR (Lagerstrom et al., *PCR Methods Applic. 1*:111-19, 1991) and walking PCR (Parker et al., *Nucl. Acids. Res. 19*:3055-60, 1991). Other methods employing amplification may also be employed to obtain a full length cDNA sequence.

In certain instances, it is possible to obtain a full length cDNA sequence by analysis of sequences provided in an expressed sequence tag (EST) database, such as that available from GenBank. Searches for overlapping ESTs may generally be performed using well known programs (*e.g.*, NCBI BLAST searches), and such ESTs may be used to generate a contiguous full length sequence.

Certain nucleic acid sequences of cDNA molecules encoding at least a portion of a prostate tumor protein are provided in SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472. Isolation of these

polynucleotides is described below. Each of these prostate tumor proteins was overexpressed in prostate tumor tissue.

Polynucleotide variants may generally be prepared by any method known in the art, including chemical synthesis by, for example, solid phase phosphoramidite chemical synthesis. Modifications in a polynucleotide sequence may also be introduced using standard mutagenesis techniques, such as oligonucleotide-directed site-specific mutagenesis (see Adelman et al., *DNA* 2:183, 1983). Alternatively, RNA molecules may be generated by *in vitro* or *in vivo* transcription of DNA sequences encoding a prostate tumor protein, or portion thereof, provided that the DNA is incorporated into a vector with a suitable RNA polymerase promoter (such as T7 or SP6). Certain portions may be used to prepare an encoded polypeptide, as described herein. In addition, or alternatively, a portion may be administered to a patient such that the encoded polypeptide is generated *in vivo* (e.g., by transfecting antigen-presenting cells, such as dendritic cells, with a cDNA construct encoding a prostate tumor polypeptide, and administering the transfected cells to the patient).

A portion of a sequence complementary to a coding sequence (*i.e.,* an antisense polynucleotide) may also be used as a probe or to modulate gene expression. cDNA constructs that can be transcribed into antisense RNA may also be introduced into cells of tissues to facilitate the production of antisense RNA. An antisense polynucleotide may be used, as described herein, to inhibit expression of a tumor protein. Antisense technology can be used to control gene expression through triple-helix formation, which compromises the ability of the double helix to open sufficiently for the binding of polymerases, transcription factors or regulatory molecules (see Gee et al., *In* Huber and Carr, *Molecular and Immunologic Approaches*, Futura Publishing Co. (Mt. Kisco, NY; 1994)). Alternatively, an antisense molecule may be designed to hybridize with a control region of a gene (e.g., promoter, enhancer or transcription initiation site), and block transcription of the gene; or to block translation by inhibiting binding of a transcript to ribosomes.

A portion of a coding sequence, or of a complementary sequence, may also be designed as a probe or primer to detect gene expression. Probes may be labeled with a variety of reporter groups, such as radionuclides and enzymes, and are preferably at least 10 nucleotides in length, more preferably at least 20 nucleotides in length and still more preferably at least 30 nucleotides in length. Primers, as noted above, are preferably 22-30 nucleotides in length.

Any polynucleotide may be further modified to increase stability *in vivo*. Possible modifications include, but are not limited to, the addition of flanking sequences at the 5' and/or 3' ends; the use of phosphorothioate or 2' O-methyl rather than phosphodiesterase linkages in the backbone; and/or the inclusion of nontraditional bases such

as inosine, queosine and wybutosine, as well as acetyl- methyl-, thio- and other modified forms of adenine, cytidine, guanine, thymine and uridine.

Nucleotide sequences as described herein may be joined to a variety of other nucleotide sequences using established recombinant DNA techniques. For example, a polynucleotide may be cloned into any of a variety of cloning vectors, including plasmids, phagemids, lambda phage derivatives and cosmids. Vectors of particular interest include expression vectors, replication vectors, probe generation vectors and sequencing vectors.. In general, a vector will contain an origin of replication functional in at least one organism, convenient restriction endonuclease sites and one or more selectable markers. Other elements will depend upon the desired use, and will be apparent to those of ordinary skill in the art.

Within certain embodiments, polynucleotides may be formulated so as to permit entry into a cell of a mammal, and expression therein. Such formulations are particularly useful for therapeutic purposes, as described below. Those of ordinary skill in the art will appreciate that there are many ways to achieve expression of a polynucleotide in a target cell, and any suitable method may be employed. For example, a polynucleotide may be incorporated into a viral vector such as, but not limited to, adenovirus, adeno-associated virus, retrovirus, or vaccinia or other pox virus (*e.g.,* avian pox virus). Techniques for incorporating DNA into such vectors are well known to those of ordinary skill in the art. A retroviral vector may additionally transfer or incorporate a gene for a selectable marker (to aid in the identification or selection of transduced cells) and/or a targeting moiety, such as a gene that encodes a ligand for a receptor on a specific target cell, to render the vector target specific. Targeting may also be accomplished using an antibody, by methods known to those of ordinary skill in the art.

Other formulations for therapeutic purposes include colloidal dispersion systems, such as macromolecule complexes, nanocapsules, microspheres, beads, and lipid-based systems including oil-in-water emulsions, micelles, mixed micelles, and liposomes. A preferred colloidal system for use as a delivery vehicle *in vitro* and *in vivo* is a liposome (*i.e.,* an artificial membrane vesicle). The preparation and use of such systems is well known in the art.

PROSTATE TUMOR POLYPEPTIDES

Within the context of the present invention, polypeptides may comprise at least an immunogenic portion of a prostate tumor protein or a variant thereof, as described herein. As noted above, a "prostate tumor protein" is a protein that is expressed by prostate tumor cells. Proteins that are prostate tumor proteins also react detectably within an immunoassay (such as an ELISA) with antisera from a patient with prostate cancer. Polypeptides as described herein may be of any length. Additional sequences derived from

the native protein and/or heterologous sequences may be present, and such sequences may (but need not) possess further immunogenic or antigenic properties.

An "immunogenic portion," as used herein is a portion of a protein that is recognized (*i.e.,* specifically bound) by a B-cell and/or T-cell surface antigen receptor. Such immunogenic portions generally comprise at least 5 amino acid residues, more preferably at least 10, and still more preferably at least 20 amino acid residues of a prostate tumor protein or a variant thereof. Certain preferred immunogenic portions include peptides in which an N-terminal leader sequence and/or transmembrane domain have been deleted. Other preferred immunogenic portions may contain a small N- and/or C-terminal deletion (*e.g.,* 1-30 amino acids, preferably 5-15 amino acids), relative to the mature protein.

Immunogenic portions may generally be identified using well known techniques, such as those summarized in Paul, *Fundamental Immunology,* 3rd ed., 243-247 (Raven Press, 1993) and references cited therein. Such techniques include screening polypeptides for the ability to react with antigen-specific antibodies, antisera and/or T-cell lines or clones. As used herein, antisera and antibodies are "antigen-specific" if they specifically bind to an antigen (*i.e.,* they react with the protein in an ELISA or other immunoassay, and do not react detectably with unrelated proteins). Such antisera and antibodies may be prepared as described herein, and using well known techniques. An immunogenic portion of a native prostate tumor protein is a portion that reacts with such antisera and/or T-cells at a level that is not substantially less than the reactivity of the full length polypeptide (*e.g.,* in an ELISA and/or T-cell reactivity assay). Such immunogenic portions may react within such assays at a level that is similar to or greater than the reactivity of the full length polypeptide. Such screens may generally be performed using methods well known to those of ordinary skill in the art, such as those described in Harlow and Lane, *Antibodies: A Laboratory Manual,* Cold Spring Harbor Laboratory, 1988. For example, a polypeptide may be immobilized on a solid support and contacted with patient sera to allow binding of antibodies within the sera to the immobilized polypeptide. Unbound sera may then be removed and bound antibodies detected using, for example, ^{125}I-labeled Protein A.

As noted above, a composition may comprise a variant of a native prostate tumor protein. A polypeptide "variant," as used herein, is a polypeptide that differs from a native prostate tumor protein in one or more substitutions, deletions, additions and/or insertions, such that the immunogenicity of the polypeptide is not substantially diminished. In other words, the ability of a variant to react with antigen-specific antisera may be enhanced or unchanged, relative to the native protein, or may be diminished by less than 50%, and preferably less than 20%, relative to the native protein. Such variants may generally be identified by modifying one of the above polypeptide sequences and evaluating the reactivity of the modified polypeptide with antigen-specific antibodies or antisera as described herein.

Preferred variants include those in which one or more portions, such as an N-terminal leader sequence or transmembrane domain, have been removed. Other preferred variants include variants in which a small portion (*e.g.*, 1-30 amino acids, preferably 5-15 amino acids) has been removed from the N- and/or C-terminal of the mature protein. Polypeptide variants preferably exhibit at least about 70%, more preferably at least about 90% and most preferably at least about 95% identity (determined as described above) to the identified polypeptides.

Preferably, a variant contains conservative substitutions. A "conservative substitution" is one in which an amino acid is substituted for another amino acid that has similar properties, such that one skilled in the art of peptide chemistry would expect the secondary structure and hydropathic nature of the polypeptide to be substantially unchanged. Amino acid substitutions may generally be made on the basis of similarity in polarity, charge, solubility, hydrophobicity, hydrophilicity and/or the amphipathic nature of the residues. For example, negatively charged amino acids include aspartic acid and glutamic acid; positively charged amino acids include lysine and arginine; and amino acids with uncharged polar head groups having similar hydrophilicity values include leucine, isoleucine and valine; glycine and alanine; asparagine and glutamine; and serine, threonine, phenylalanine and tyrosine. Other groups of amino acids that may represent conservative changes include: (1) ala, pro, gly, glu, asp, gln, asn, ser, thr; (2) cys, ser, tyr, thr; (3) val, ile, leu, met, ala, phe; (4) lys, arg, his; and (5) phe, tyr, trp, his. A variant may also, or alternatively, contain nonconservative changes. In a preferred embodiment, variant polypeptides differ from a native sequence by substitution, deletion or addition of five amino acids or fewer. Variants may also (or alternatively) be modified by, for example, the deletion or addition of amino acids that have minimal influence on the immunogenicity, secondary structure and hydropathic nature of the polypeptide.

As noted above, polypeptides may comprise a signal (or leader) sequence at the N-terminal end of the protein which co-translationally or post-translationally directs transfer of the protein. The polypeptide may also be conjugated to a linker or other sequence for ease of synthesis, purification or identification of the polypeptide (*e.g.*, poly-His), or to enhance binding of the polypeptide to a solid support. For example, a polypeptide may be conjugated to an immunoglobulin Fc region.

Polypeptides may be prepared using any of a variety of well known techniques. Recombinant polypeptides encoded by DNA sequences as described above may be readily prepared from the DNA sequences using any of a variety of expression vectors known to those of ordinary skill in the art. Expression may be achieved in any appropriate host cell that has been transformed or transfected with an expression vector containing a DNA molecule that encodes a recombinant polypeptide. Suitable host cells include prokaryotes, yeast and higher eukaryotic cells. Preferably, the host cells employed are

E. coli, yeast or a mammalian cell line such as COS or CHO. Supernatants from suitable host/vector systems which secrete recombinant protein or polypeptide into culture media may be first concentrated using a commercially available filter. Following concentration, the concentrate may be applied to a suitable purification matrix such as an affinity matrix or an ion exchange resin. Finally, one or more reverse phase HPLC steps can be employed to further purify a recombinant polypeptide.

Portions and other variants having fewer than about 100 amino acids, and generally fewer than about 50 amino acids, may also be generated by synthetic means, using techniques well known to those of ordinary skill in the art. For example, such polypeptides may be synthesized using any of the commercially available solid-phase techniques, such as the Merrifield solid-phase synthesis method, where amino acids are sequentially added to a growing amino acid chain. *See* Merrifield, *J. Am. Chem. Soc.* *85*:2149-2146, 1963. Equipment for automated synthesis of polypeptides is commercially available from suppliers such as Perkin Elmer/Applied BioSystems Division (Foster City, CA), and may be operated according to the manufacturer's instructions.

Within certain specific embodiments, a polypeptide may be a fusion protein that comprises multiple polypeptides as described herein, or that comprises at least one polypeptide as described herein and an unrelated sequence, such as a known tumor protein. A fusion partner may, for example, assist in providing T helper epitopes (an immunological fusion partner), preferably T helper epitopes recognized by humans, or may assist in expressing the protein (an expression enhancer) at higher yields than the native recombinant protein. Certain preferred fusion partners are both immunological and expression enhancing fusion partners. Other fusion partners may be selected so as to increase the solubility of the protein or to enable the protein to be targeted to desired intracellular compartments. Still further fusion partners include affinity tags, which facilitate purification of the protein.

Fusion proteins may generally be prepared using standard techniques, including chemical conjugation. Preferably, a fusion protein is expressed as a recombinant protein, allowing the production of increased levels, relative to a non-fused protein, in an expression system. Briefly, DNA sequences encoding the polypeptide components may be assembled separately, and ligated into an appropriate expression vector. The 3' end of the DNA sequence encoding one polypeptide component is ligated, with or without a peptide linker, to the 5' end of a DNA sequence encoding the second polypeptide component so that the reading frames of the sequences are in phase. This permits translation into a single fusion protein that retains the biological activity of both component polypeptides.

A peptide linker sequence may be employed to separate the first and the second polypeptide components by a distance sufficient to ensure that each polypeptide folds into its secondary and tertiary structures. Such a peptide linker sequence is incorporated into

the fusion protein using standard techniques well known in the art. Suitable peptide linker sequences may be chosen based on the following factors: (1) their ability to adopt a flexible extended conformation; (2) their inability to adopt a secondary structure that could interact with functional epitopes on the first and second polypeptides; and (3) the lack of hydrophobic or charged residues that might react with the polypeptide functional epitopes. Preferred peptide linker sequences contain Gly, Asn and Ser residues. Other near neutral amino acids, such as Thr and Ala may also be used in the linker sequence. Amino acid sequences which may be usefully employed as linkers include those disclosed in Maratea et al., *Gene* 40:39-46, 1985; Murphy et al., *Proc. Natl. Acad. Sci. USA* 83:8258-8262, 1986; U.S. Patent No. 4,935,233 and U.S. Patent No. 4,751,180. The linker sequence may generally be from 1 to about 50 amino acids in length. Linker sequences are not required when the first and second polypeptides have non-essential N-terminal amino acid regions that can be used to separate the functional domains and prevent steric interference.

The ligated DNA sequences are operably linked to suitable transcriptional or translational regulatory elements. The regulatory elements responsible for expression of DNA are located only 5' to the DNA sequence encoding the first polypeptides. Similarly, stop codons required to end translation and transcription termination signals are only present 3' to the DNA sequence encoding the second polypeptide.

Fusion proteins are also provided that comprise a polypeptide of the present invention together with an unrelated immunogenic protein. Preferably the immunogenic protein is capable of eliciting a recall response. Examples of such proteins include tetanus, tuberculosis and hepatitis proteins (*see*, for example, Stoute et al. *New Engl. J. Med.*, 336:86-91, 1997).

Within preferred embodiments, an immunological fusion partner is derived from protein D, a surface protein of the gram-negative bacterium Haemophilus influenza B (WO 91/18926). Preferably, a protein D derivative comprises approximately the first third of the protein (*e.g.*, the first N-terminal 100-110 amino acids), and a protein D derivative may be lipidated. Within certain preferred embodiments, the first 109 residues of a Lipoprotein D fusion partner is included on the N-terminus to provide the polypeptide with additional exogenous T-cell epitopes and to increase the expression level in *E. coli* (thus functioning as an expression enhancer). The lipid tail ensures optimal presentation of the antigen to antigen presenting cells. Other fusion partners include the non-structural protein from influenzae virus, NS1 (hemaglutinin). Typically, the N-terminal 81 amino acids are used, although different fragments that include T-helper epitopes may be used.

In another embodiment, the immunological fusion partner is the protein known as LYTA, or a portion thereof (preferably a C-terminal portion). LYTA is derived from *Streptococcus pneumoniae*, which synthesizes an N-acetyl-L-alanine amidase known as

amidase LYTA (encoded by the LytA gene; *Gene 43*:265-292, 1986). LYTA is an autolysin that specifically degrades certain bonds in the peptidoglycan backbone. The C-terminal domain of the LYTA protein is responsible for the affinity to the choline or to some choline analogues such as DEAE. This property has been exploited for the development of *E. coli* C-LYTA expressing plasmids useful for expression of fusion proteins. Purification of hybrid proteins containing the C-LYTA fragment at the amino terminus has been described (*see Biotechnology 10*:795-798, 1992). Within a preferred embodiment, a repeat portion of LYTA may be incorporated into a fusion protein. A repeat portion is found in the C-terminal region starting at residue 178. A particularly preferred repeat portion incorporates residues 188-305.

In general, polypeptides (including fusion proteins) and polynucleotides as described herein are isolated. An "isolated" polypeptide or polynucleotide is one that is removed from its original environment. For example, a naturally-occurring protein is isolated if it is separated from some or all of the coexisting materials in the natural system. Preferably, such polypeptides are at least about 90% pure, more preferably at least about 95% pure and most preferably at least about 99% pure. A polynucleotide is considered to be isolated if, for example, it is cloned into a vector that is not a part of the natural environment.

BINDING AGENTS

The present invention further provides agents, such as antibodies and antigen-binding fragments thereof, that specifically bind to a prostate tumor protein. As used herein, an antibody, or antigen-binding fragment thereof, is said to "specifically bind" to a prostate tumor protein if it reacts at a detectable level (within, for example, an ELISA) with a prostate tumor protein, and does not react detectably with unrelated proteins under similar conditions. As used herein, "binding" refers to a noncovalent association between two separate molecules such that a complex is formed. The ability to bind may be evaluated by, for example, determining a binding constant for the formation of the complex. The binding constant is the value obtained when the concentration of the complex is divided by the product of the component concentrations. In general, two compounds are said to "bind," in the context of the present invention, when the binding constant for complex formation exceeds about 10^3 L/mol. The binding constant may be determined using methods well known in the art.

Binding agents may be further capable of differentiating between patients with and without a cancer, such as prostate cancer, using the representative assays provided herein. In other words, antibodies or other binding agents that bind to a prostate tumor protein will generate a signal indicating the presence of a cancer in at least about 20% of patients with the disease, and will generate a negative signal indicating the absence of the disease in at least about 90% of individuals without the cancer. To determine whether a binding agent satisfies this requirement, biological samples (*e.g.*, blood, sera, urine and/or tumor biopsies) from

patients with and without a cancer (as determined using standard clinical tests) may be assayed as described herein for the presence of polypeptides that bind to the binding agent. It will be apparent that a statistically significant number of samples with and without the disease should be assayed. Each binding agent should satisfy the above criteria; however, those of ordinary skill in the art will recognize that binding agents may be used in combination to improve sensitivity.

Any agent that satisfies the above requirements may be a binding agent. For example, a binding agent may be a ribosome, with or without a peptide component, an RNA molecule or a polypeptide. In a preferred embodiment, a binding agent is an antibody or an antigen-binding fragment thereof. Antibodies may be prepared by any of a variety of techniques known to those of ordinary skill in the art. See, e.g., Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. In general, antibodies can be produced by cell culture techniques, including the generation of monoclonal antibodies as described herein, or via transfection of antibody genes into suitable bacterial or mammalian cell hosts, in order to allow for the production of recombinant antibodies. In one technique, an immunogen comprising the polypeptide is initially injected into any of a wide variety of mammals (e.g., mice, rats, rabbits, sheep or goats). In this step, the polypeptides of this invention may serve as the immunogen without modification. Alternatively, particularly for relatively short polypeptides, a superior immune response may be elicited if the polypeptide is joined to a carrier protein, such as bovine serum albumin or keyhole limpet hemocyanin. The immunogen is injected into the animal host, preferably according to a predetermined schedule incorporating one or more booster immunizations, and the animals are bled periodically. Polyclonal antibodies specific for the polypeptide may then be purified from such antisera by, for example, affinity chromatography using the polypeptide coupled to a suitable solid support.

Monoclonal antibodies specific for an antigenic polypeptide of interest may be prepared, for example, using the technique of Kohler and Milstein, *Eur. J. Immunol.* 6:511-519, 1976, and improvements thereto. Briefly, these methods involve the preparation of immortal cell lines capable of producing antibodies having the desired specificity (i.e., reactivity with the polypeptide of interest). Such cell lines may be produced, for example, from spleen cells obtained from an animal immunized as described above. The spleen cells are then immortalized by, for example, fusion with a myeloma cell fusion partner, preferably one that is syngeneic with the immunized animal. A variety of fusion techniques may be employed. For example, the spleen cells and myeloma cells may be combined with a nonionic detergent for a few minutes and then plated at low density on a selective medium that supports the growth of hybrid cells, but not myeloma cells. A preferred selection technique uses HAT (hypoxanthine, aminopterin, thymidine) selection. After a sufficient

time, usually about 1 to 2 weeks, colonies of hybrids are observed. Single colonies are selected and their culture supernatants tested for binding activity against the polypeptide. Hybridomas having high reactivity and specificity are preferred.

Monoclonal antibodies may be isolated from the supernatants of growing hybridoma colonies. In addition, various techniques may be employed to enhance the yield, such as injection of the hybridoma cell line into the peritoneal cavity of a suitable vertebrate host, such as a mouse. Monoclonal antibodies may then be harvested from the ascites fluid or the blood. Contaminants may be removed from the antibodies by conventional techniques, such as chromatography, gel filtration, precipitation, and extraction. The polypeptides of this invention may be used in the purification process in, for example, an affinity chromatography step.

Within certain embodiments, the use of antigen-binding fragments of antibodies may be preferred. Such fragments include Fab fragments, which may be prepared using standard techniques. Briefly, immunoglobulins may be purified from rabbit serum by affinity chromatography on Protein A bead columns (Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988) and digested by papain to yield Fab and Fc fragments. The Fab and Fc fragments may be separated by affinity chromatography on protein A bead columns.

Monoclonal antibodies of the present invention may be coupled to one or more therapeutic agents. Suitable agents in this regard include radionuclides, differentiation inducers, drugs, toxins, and derivatives thereof. Preferred radionuclides include ^{90}Y, ^{123}I, ^{125}I, ^{131}I, ^{186}Re, ^{188}Re, ^{211}At, and ^{212}Bi. Preferred drugs include methotrexate, and pyrimidine and purine analogs. Preferred differentiation inducers include phorbol esters and butyric acid. Preferred toxins include ricin, abrin, diptheria toxin, cholera toxin, gelonin, Pseudomonas exotoxin, Shigella toxin, and pokeweed antiviral protein.

A therapeutic agent may be coupled (e.g., covalently bonded) to a suitable monoclonal antibody either directly or indirectly (e.g., via a linker group). A direct reaction between an agent and an antibody is possible when each possesses a substituent capable of reacting with the other. For example, a nucleophilic group, such as an amino or sulfhydryl group, on one may be capable of reacting with a carbonyl-containing group, such as an anhydride or an acid halide, or with an alkyl group containing a good leaving group (e.g., a halide) on the other.

Alternatively, it may be desirable to couple a therapeutic agent and an antibody via a linker group. A linker group can function as a spacer to distance an antibody from an agent in order to avoid interference with binding capabilities. A linker group can also serve to increase the chemical reactivity of a substituent on an agent or an antibody, and

thus increase the coupling efficiency. An increase in chemical reactivity may also facilitate the use of agents, or functional groups on agents, which otherwise would not be possible.

It will be evident to those skilled in the art that a variety of bifunctional or polyfunctional reagents, both homo- and hetero-functional (such as those described in the catalog of the Pierce Chemical Co., Rockford, IL), may be employed as the linker group. Coupling may be effected, for example, through amino groups, carboxyl groups, sulfhydryl groups or oxidized carbohydrate residues. There are numerous references describing such methodology, e.g., U.S. Patent No. 4,671,958, to Rodwell et al.

Where a therapeutic agent is more potent when free from the antibody portion of the immunoconjugates of the present invention, it may be desirable to use a linker group which is cleavable during or upon internalization into a cell. A number of different cleavable linker groups have been described. The mechanisms for the intracellular release of an agent from these linker groups include cleavage by reduction of a disulfide bond (e.g., U.S. Patent No. 4,489,710, to Spitler), by irradiation of a photolabile bond (e.g., U.S. Patent No. 4,625,014, to Senter et al.), by hydrolysis of derivatized amino acid side chains (e.g., U.S. Patent No. 4,638,045, to Kohn et al.), by serum complement-mediated hydrolysis (e.g., U.S. Patent No. 4,671,958, to Rodwell et al.), and acid-catalyzed hydrolysis (e.g., U.S. Patent No. 4,569,789, to Blattler et al.).

It may be desirable to couple more than one agent to an antibody. In one embodiment, multiple molecules of an agent are coupled to one antibody molecule. In another embodiment, more than one type of agent may be coupled to one antibody. Regardless of the particular embodiment, immunoconjugates with more than one agent may be prepared in a variety of ways. For example, more than one agent may be coupled directly to an antibody molecule, or linkers which provide multiple sites for attachment can be used. Alternatively, a carrier can be used.

A carrier may bear the agents in a variety of ways, including covalent bonding either directly or via a linker group. Suitable carriers include proteins such as albumins (e.g., U.S. Patent No. 4,507,234, to Kato et al.), peptides and polysaccharides such as aminodextran (e.g., U.S. Patent No. 4,699,784, to Shih et al.). A carrier may also bear an agent by noncovalent bonding or by encapsulation, such as within a liposome vesicle (e.g., U.S. Patent Nos. 4,429,008 and 4,873,088). Carriers specific for radionuclide agents include radiohalogenated small molecules and chelating compounds. For example, U.S. Patent No. 4,735,792 discloses representative radiohalogenated small molecules and their synthesis. A radionuclide chelate may be formed from chelating compounds that include those containing nitrogen and sulfur atoms as the donor atoms for binding the metal, or metal oxide, radionuclide. For example, U.S. Patent No. 4,673,562, to Davison et al. discloses representative chelating compounds and their synthesis.

A variety of routes of administration for the antibodies and immunoconjugates may be used. Typically, administration will be intravenous, intramuscular, subcutaneous or in the bed of a resected tumor. It will be evident that the precise dose of the antibody/immunoconjugate will vary depending upon the antibody used, the antigen density on the tumor, and the rate of clearance of the antibody.

T CELLS

Immunotherapeutic compositions may also, or alternatively, comprise T cells specific for a prostate tumor protein. Such cells may generally be prepared *in vitro* or *ex vivo*, using standard procedures. For example, T cells may be isolated from bone marrow, peripheral blood, or a fraction of bone marrow or peripheral blood of a patient, using a commercially available cell separation system, such as the CEPRATE™ system, available from CellPro Inc., Bothell WA (*see also* U.S. Patent No. 5,240,856; U.S. Patent No. 5,215,926; WO 89/06280; WO 91/16116 and WO 92/07243). Alternatively, T cells may be derived from related or unrelated humans, non-human mammals, cell lines or cultures.

T cells may be stimulated with a prostate tumor polypeptide, polynucleotide encoding a prostate tumor polypeptide and/or an antigen presenting cell (APC) that expresses such a polypeptide. Such stimulation is performed under conditions and for a time sufficient to permit the generation of T cells that are specific for the polypeptide. Preferably, a prostate tumor polypeptide or polynucleotide is present within a delivery vehicle, such as a microsphere, to facilitate the generation of specific T cells.

T cells are considered to be specific for a prostate tumor polypeptide if the T cells kill target cells coated with the polypeptide or expressing a gene encoding the polypeptide. T cell specificity may be evaluated using any of a variety of standard techniques. For example, within a chromium release assay or proliferation assay, a stimulation index of more than two fold increase in lysis and/or proliferation, compared to negative controls, indicates T cell specificity. Such assays may be performed, for example, as described in Chen et al., *Cancer Res.* 54:1065-1070, 1994. Alternatively, detection of the proliferation of T cells may be accomplished by a variety of known techniques. For example, T cell proliferation can be detected by measuring an increased rate of DNA synthesis (e.g., by pulse-labeling cultures of T cells with tritiated thymidine and measuring the amount of tritiated thymidine incorporated into DNA). Contact with a prostate tumor polypeptide (100 ng/ml - 100 μg/ml, preferably 200 ng/ml - 25 μg/ml) for 3 - 7 days should result in at least a two fold increase in proliferation of the T cells. Contact as described above for 2-3 hours should result in activation of the T cells, as measured using standard cytokine assays in which a two fold increase in the level of cytokine release (e.g., TNF or IFN-γ) is indicative of T cell activation (see Coligan et al., Current Protocols in Immunology, vol. 1, Wiley Interscience

(Greene 1998)). T cells that have been activated in response to a prostate tumor polypeptide, polynucleotide or polypeptide-expressing APC may be CD4$^-$ and/or CD8$^+$. Prostate tumor protein-specific T cells may be expanded using standard techniques. Within preferred embodiments, the T cells are derived from either a patient or a related, or unrelated, donor and are administered to the patient following stimulation and expansion.

For therapeutic purposes, CD4$^+$ or CD8$^+$ T cells that proliferate in response to a prostate tumor polypeptide, polynucleotide or APC can be expanded in number either *in vitro* or *in vivo*. Proliferation of such T cells *in vitro* may be accomplished in a variety of ways. For example, the T cells can be re-exposed to a prostate tumor polypeptide, or a short peptide corresponding to an immunogenic portion of such a polypeptide, with or without the addition of T cell growth factors, such as interleukin-2, and/or stimulator cells that synthesize a prostate tumor polypeptide. Alternatively, one or more T cells that proliferate in the presence of a prostate tumor protein can be expanded in number by cloning. Methods for cloning cells are well known in the art, and include limiting dilution.

PHARMACEUTICAL COMPOSITIONS AND VACCINES

Within certain aspects, polypeptides, polynucleotides, T cells and/or binding agents disclosed herein may be incorporated into pharmaceutical compositions or immunogenic compositions (*i.e.*, vaccines). Pharmaceutical compositions comprise one or more such compounds and a physiologically acceptable carrier. Vaccines may comprise one or more such compounds and a non-specific immune response enhancer. A non-specific immune response enhancer may be any substance that enhances an immune response to an exogenous antigen. Examples of non-specific immune response enhancers include adjuvants, biodegradable microspheres (*e.g.*, polylactic galactide) and liposomes (into which the compound is incorporated; *see e.g.*, Fullerton, U.S. Patent No. 4,235,877). Vaccine preparation is generally described in, for example, M.F. Powell and M.J. Newman, eds., "Vaccine Design (the subunit and adjuvant approach)," Plenum Press (NY, 1995). Pharmaceutical compositions and vaccines within the scope of the present invention may also contain other compounds, which may be biologically active or inactive. For example, one or more immunogenic portions of other tumor antigens may be present, either incorporated into a fusion polypeptide or as a separate compound, within the composition or vaccine.

A pharmaceutical composition or vaccine may contain DNA encoding one or more of the polypeptides as described above, such that the polypeptide is generated *in situ*. As noted above, the DNA may be present within any of a variety of delivery systems known to those of ordinary skill in the art, including nucleic acid expression systems, bacteria and viral expression systems. Numerous gene delivery techniques are well known in the art, such as those described by Rolland, *Crit. Rev. Therap. Drug Carrier Systems 15*:143-198, 1998,

and references cited therein. Appropriate nucleic acid expression systems contain the necessary DNA sequences for expression in the patient (such as a suitable promoter and terminating signal). Bacterial delivery systems involve the administration of a bacterium (such as *Bacillus-Calmette-Guerrin*) that expresses an immunogenic portion of the polypeptide on its cell surface or secretes such an epitope. In a preferred embodiment, the DNA may be introduced using a viral expression system (*e.g.*, vaccinia or other pox virus, retrovirus, or adenovirus), which may involve the use of a non-pathogenic (defective), replication competent virus. Suitable systems are disclosed, for example, in Fisher-Hoch et al., *Proc. Natl. Acad. Sci. USA 86*:317-321, 1989; Flexner et al., *Ann. N.Y. Acad. Sci. 569*:86-103, 1989; Flexner et al., *Vaccine 8*:17-21, 1990; U.S. Patent Nos. 4,603,112, 4,769,330, and 5,017,487; WO 89/01973; U.S. Patent No. 4,777,127; GB 2,200,651; EP 0,345,242; WO 91/02805; Berkner, *Biotechniques 6*:616-627, 1988; Rosenfeld et al., *Science 252*:431-434, 1991; Kolls et al., *Proc. Natl. Acad. Sci. USA 91*:215-219, 1994; Kass-Eisler et al., *Proc. Natl. Acad. Sci. USA 90*:11498-11502, 1993; Guzman et al., *Circulation 88*:2838-2848, 1993; and Guzman et al., *Cir. Res. 73*:1202-1207, 1993. Techniques for incorporating DNA into such expression systems are well known to those of ordinary skill in the art. The DNA may also be "naked," as described, for example, in Ulmer et al., *Science 259*:1745-1749, 1993 and reviewed by Cohen, *Science 259*:1691-1692, 1993. The uptake of naked DNA may be increased by coating the DNA onto biodegradable beads, which are efficiently transported into the cells.

While any suitable carrier known to those of ordinary skill in the art may be employed in the pharmaceutical compositions of this invention, the type of carrier will vary depending on the mode of administration. Compositions of the present invention may be formulated for any appropriate manner of administration, including for example, topical, oral, nasal, intravenous, intracranial, intraperitoneal, subcutaneous or intramuscular administration. For parenteral administration, such as subcutaneous injection, the carrier preferably comprises water, saline, alcohol, a fat, a wax or a buffer. For oral administration, any of the above carriers or a solid carrier, such as mannitol, lactose, starch, magnesium stearate, sodium saccharine, talcum, cellulose, glucose, sucrose, and magnesium carbonate, may be employed. Biodegradable microspheres (*e.g.*, polylactate polyglycolate) may also be employed as carriers for the pharmaceutical compositions of this invention. Suitable biodegradable microspheres are disclosed, for example, in U.S. Patent Nos. 4,897,268 and 5,075,109.

Such compositions may also comprise buffers (*e.g.*, neutral buffered saline or phosphate buffered saline), carbohydrates (*e.g.*, glucose, mannose, sucrose or dextrans), mannitol, proteins, polypeptides or amino acids such as glycine, antioxidants, chelating agents such as EDTA or glutathione, adjuvants (*e.g.*, aluminum hydroxide) and/or

preservatives. Alternatively, compositions of the present invention may be formulated as a lyophilizate. Compounds may also be encapsulated within liposomes using well known technology.

Any of a variety of non-specific immune response enhancers may be employed in the vaccines of this invention. For example, an adjuvant may be included. Most adjuvants contain a substance designed to protect the antigen from rapid catabolism, such as aluminum hydroxide or mineral oil, and a stimulator of immune responses, such as lipid A, *Bortadella pertussis* or *Mycobacterium tuberculosis* derived proteins. Suitable adjuvants are commercially available as, for example, Freund's Incomplete Adjuvant and Complete Adjuvant (Difco Laboratories, Detroit, MI); Merck Adjuvant 65 (Merck and Company, Inc., Rahway, NJ); aluminum salts such as aluminum hydroxide gel (alum) or aluminum phosphate; salts of calcium, iron or zinc; an insoluble suspension of acylated tyrosine; acylated sugars; cationically or anionically derivatized polysaccharides; polyphosphazenes; biodegradable microspheres; monophosphoryl lipid A and quil A. Cytokines, such as GM-CSF or interleukin-2, -7, or -12, may also be used as adjuvants.

Within the vaccines provided herein, the adjuvant composition is preferably designed to induce an immune response predominantly of the Th1 type. High levels of Th1-type cytokines (*e.g.*, IFN-γ, IL-2 and IL-12) tend to favor the induction of cell mediated immune responses to an administered antigen. In contrast, high levels of Th2-type cytokines (*e.g.*, IL-4, IL-5, IL-6, IL-10 and TNF-β) tend to favor the induction of humoral immune responses. Following application of a vaccine as provided herein, a patient will support an immune response that includes Th1- and Th2-type responses. Within a preferred embodiment, in which a response is predominantly Th1-type, the level of Th1-type cytokines will increase to a greater extent than the level of Th2-type cytokines. The levels of these cytokines may be readily assessed using standard assays. For a review of the families of cytokines, see Mosmann and Coffman, *Ann. Rev. Immunol.* 7:145-173, 1989.

Preferred adjuvants for use in eliciting a predominantly Th1-type response include, for example, a combination of monophosphoryl lipid A, preferably 3-de-O-acylated monophosphoryl lipid A (3D-MPL), together with an aluminum salt. MPL adjuvants are available from Ribi ImmunoChem Research Inc. (Hamilton, MT; *see* US Patent Nos. 4,436,727; 4,877,611; 4,866,034 and 4,912,094). CpG-containing oligonucleotides (in which the CpG dinucleotide is unmethylated) also induce a predominantly Th1 response. Such oligonucleotides are well known and are described, for example, in WO 96/02555. Another preferred adjuvant is a saponin, preferably QS21, which may be used alone or in combination with other adjuvants. For example, an enhanced system involves the combination of a monophosphoryl lipid A and saponin derivative, such as the combination of QS21 and 3D-MPL as described in WO 94/00153, or a less reactogenic composition where the QS21 is

quenched with cholesterol, as described in WO 96/33739. Other preferred formulations comprises an oil-in-water emulsion and tocopherol. A particularly potent adjuvant formulation involving QS21, 3D-MPL and tocopherol in an oil-in-water emulsion is described in WO 95/17210. Any vaccine provided herein may be prepared using well known methods that result in a combination of antigen, immune response enhancer and a suitable carrier or excipient.

The compositions described herein may be administered as part of a sustained release formulation (*i.e.*, a formulation such as a capsule or sponge that effects a slow release of compound following administration). Such formulations may generally be prepared using well known technology and administered by, for example, oral, rectal or subcutaneous implantation, or by implantation at the desired target site. Sustained-release formulations may contain a polypeptide, polynucleotide or antibody dispersed in a carrier matrix and/or contained within a reservoir surrounded by a rate controlling membrane. Carriers for use within such formulations are biocompatible, and may also be biodegradable; preferably the formulation provides a relatively constant level of active component release. The amount of active compound contained within a sustained release formulation depends upon the site of implantation, the rate and expected duration of release and the nature of the condition to be treated or prevented.

Any of a variety of delivery vehicles may be employed within pharmaceutical compositions and vaccines to facilitate production of an antigen-specific immune response that targets tumor cells. Delivery vehicles include antigen presenting cells (APCs), such as dendritic cells, macrophages, B cells, monocytes and other cells that may be engineered to be efficient APCs. Such cells may, but need not, be genetically modified to increase the capacity for presenting the antigen, to improve activation and/or maintenance of the T cell response, to have anti-tumor effects *per se* and/or to be immunologically compatible with the receiver (*i.e.*, matched HLA haplotype). APCs may generally be isolated from any of a variety of biological fluids and organs, including tumor and peritumoral tissues, and may be autologous, allogeneic, syngeneic or xenogeneic cells.

Certain preferred embodiments of the present invention use dendritic cells or progenitors thereof as antigen-presenting cells. Dendritic cells are highly potent APCs (Banchereau and Steinman, *Nature 392*:245-251, 1998) and have been shown to be effective as a physiological adjuvant for eliciting prophylactic or therapeutic antitumor immunity (*see* Timmerman and Levy, *Ann. Rev. Med. 50*:507-529, 1999). In general, dendritic cells may be identified based on their typical shape (stellate *in situ*, with marked cytoplasmic processes (dendrites) visible *in vitro*) and based on the lack of differentiation markers of B cells (CD19 and CD20), T cells (CD3), monocytes (CD14) and natural killer cells (CD56), as determined using standard assays. Dendritic cells may, of course, be engineered to express specific cell-

surface receptors or ligands that are not commonly found on dendritic cells *in vivo* or *ex vivo*, and such modified dendritic cells are contemplated by the present invention. As an alternative to dendritic cells, secreted vesicles antigen-loaded dendritic cells (called exosomes) may be used within a vaccine (*see* Zitvogel et al., *Nature Med.* 4:594-600, 1998).

Dendritic cells and progenitors may be obtained from peripheral blood, bone marrow, tumor-infiltrating cells, peritumoral tissues-infiltrating cells, lymph nodes, spleen, skin, umbilical cord blood or any other suitable tissue or fluid. For example, dendritic cells may be differentiated *ex vivo* by adding a combination of cytokines such as GM-CSF, IL-4, IL-13 and/or TNFα to cultures of monocytes harvested from peripheral blood. Alternatively, CD34 positive cells harvested from peripheral blood, umbilical cord blood or bone marrow may be differentiated into dendritic cells by adding to the culture medium combinations of GM-CSF, IL-3, TNFα, CD40 ligand, LPS, flt3 ligand and/or other compound(s) that induce maturation and proliferation of dendritic cells.

Dendritic cells are conveniently categorized as "immature" and "mature" cells, which allows a simple way to discriminate between two well characterized phenotypes. However, this nomenclature should not be construed to exclude all possible intermediate stages of differentiation. Immature dendritic cells are characterized as APC with a high capacity for antigen uptake and processing, which correlates with the high expression of Fcγ receptor, mannose receptor and DEC-205 marker. The mature phenotype is typically characterized by a lower expression of these markers, but a high expression of cell surface molecules responsible for T cell activation such as class I and class II MHC, adhesion molecules (*e.g.*, CD54 and CD11) and costimulatory molecules (*e.g.*, CD40, CD80 and CD86).

APCs may generally be transfected with a polynucleotide encoding a prostate tumor protein (or portion or other variant thereof) such that the prostate tumor polypeptide, or an immunogenic portion thereof, is expressed on the cell surface. Such transfection may take place *ex vivo*, and a composition or vaccine comprising such transfected cells may then be used for therapeutic purposes, as described herein. Alternatively, a gene delivery vehicle that targets a dendritic or other antigen presenting cell may be administered to a patient, resulting in transfection that occurs *in vivo*. *In vivo* and *ex vivo* transfection of dendritic cells, for example, may generally be performed using any methods known in the art, such as those described in WO 97/24447, or the gene gun approach described by Mahvi et al., *Immunology and cell Biology* 75:456-460, 1997. Antigen loading of dendritic cells may be achieved by incubating dendritic cells or progenitor cells with the prostate tumor polypeptide, DNA (naked or within a plasmid vector) or RNA; or with antigen-expressing recombinant bacterium or viruses (*e.g.*, vaccinia, fowlpox, adenovirus or lentivirus vectors). Prior to loading, the polypeptide may be covalently conjugated to an immunological partner that

provides T cell help (*e.g.*, a carrier molecule). Alternatively, a dendritic cell may be pulsed with a non-conjugated immunological partner, separately or in the presence of the polypeptide.

CANCER THERAPY

In further aspects of the present invention, the compositions described herein may be used for immunotherapy of cancer, such as prostate cancer. Within such methods, pharmaceutical compositions and vaccines are typically administered to a patient. As used herein, a "patient" refers to any warm-blooded animal, preferably a human. A patient may or may not be afflicted with cancer. Accordingly, the above pharmaceutical compositions and vaccines may be used to prevent the development of a cancer or to treat a patient afflicted with a cancer. A cancer may be diagnosed using criteria generally accepted in the art, including the presence of a malignant tumor. Pharmaceutical compositions and vaccines may be administered either prior to or following surgical removal of primary tumors and/or treatment such as administration of radiotherapy or conventional chemotherapeutic drugs.

Within certain embodiments, immunotherapy may be active immunotherapy, in which treatment relies on the *in vivo* stimulation of the endogenous host immune system to react against tumors with the administration of immune response-modifying agents (such as polypeptides and polynucleotides disclosed herein).

Within other embodiments, immunotherapy may be passive immunotherapy, in which treatment involves the delivery of agents with established tumor-immune reactivity (such as effector cells or antibodies) that can directly or indirectly mediate antitumor effects and does not necessarily depend on an intact host immune system. Examples of effector cells include T cells as discussed above, T lymphocytes (such as CD8^{+} cytotoxic T lymphocytes and CD4^{+} T-helper tumor-infiltrating lymphocytes), killer cells (such as Natural Killer cells and lymphokine-activated killer cells), B cells and antigen-presenting cells (such as dendritic cells and macrophages) expressing a polypeptide provided herein. T cell receptors and antibody receptors specific for the polypeptides recited herein may be cloned, expressed and transferred into other vectors or effector cells for adoptive immunotherapy. The polypeptides provided herein may also be used to generate antibodies or anti-idiotypic antibodies (as described above and in U.S. Patent No. 4,918,164) for passive immunotherapy.

Effector cells may generally be obtained in sufficient quantities for adoptive immunotherapy by growth *in vitro*, as described herein. Culture conditions for expanding single antigen-specific effector cells to several billion in number with retention of antigen recognition *in vivo* are well known in the art. Such *in vitro* culture conditions typically use intermittent stimulation with antigen, often in the presence of cytokines (such as IL-2) and non-dividing feeder cells. As noted above, immunoreactive polypeptides as provided herein

may be used to rapidly expand antigen-specific T cell cultures in order to generate a sufficient number of cells for immunotherapy. In particular, antigen-presenting cells, such as dendritic, macrophage, monocyte, fibroblast or B cells, may be pulsed with immunoreactive polypeptides or transfected with one or more polynucleotides using standard techniques well known in the art. For example, antigen-presenting cells can be transfected with a polynucleotide having a promoter appropriate for increasing expression in a recombinant virus or other expression system. Cultured effector cells for use in therapy must be able to grow and distribute widely, and to survive long term *in vivo*. Studies have shown that cultured effector cells can be induced to grow in vivo and to survive long term in substantial numbers by repeated stimulation with antigen supplemented with IL-2 (*see*, for example, Cheever et al., *Immunological Reviews 157*:177, 1997).

Alternatively, a vector expressing a polypeptide recited herein may be introduced into antigen presenting cells taken from a patient and clonally propagated *ex vivo* for transplant back into the same patient. Transfected cells may be reintroduced into the patient using any means known in the art, preferably in sterile form by intravenous, intracavitary, intraperitoneal or intratumor administration.

Routes and frequency of administration of the therapeutic compositions disclosed herein, as well as dosage, will vary from individual to individual, and may be readily established using standard techniques. In general, the pharmaceutical compositions and vaccines may be administered by injection (*e.g.*, intracutaneous, intramuscular, intravenous or subcutaneous), intranasally (*e.g.*, by aspiration) or orally. Preferably, between 1 and 10 doses may be administered over a 52 week period. Preferably, 6 doses are administered, at intervals of 1 month, and booster vaccinations may be given periodically thereafter. Alternate protocols may be appropriate for individual patients. A suitable dose is an amount of a compound that, when administered as described above, is capable of promoting an anti-tumor immune response, and is at least 10-50% above the basal (*i.e.*, untreated) level. Such response can be monitored by measuring the anti-tumor antibodies in a patient or by vaccine-dependent generation of cytolytic effector cells capable of killing the patient's tumor cells *in vitro*. Such vaccines should also be capable of causing an immune response that leads to an improved clinical outcome (*e.g.*, more frequent remissions, complete or partial or longer disease-free survival) in vaccinated patients as compared to non-vaccinated patients. In general, for pharmaceutical compositions and vaccines comprising one or more polypeptides, the amount of each polypeptide present in a dose ranges from about 100 µg to 5 mg per kg of host. Suitable dose sizes will vary with the size of the patient, but will typically range from about 0.1 mL to about 5 mL.

In general, an appropriate dosage and treatment regimen provides the active compound(s) in an amount sufficient to provide therapeutic and/or prophylactic benefit. Such

a response can be monitored by establishing an improved clinical outcome (e.g., more frequent remissions, complete or partial, or longer disease-free survival) in treated patients as compared to non-treated patients. Increases in preexisting immune responses to a prostate tumor protein generally correlate with an improved clinical outcome. Such immune responses may generally be evaluated using standard proliferation, cytotoxicity or cytokine assays, which may be performed using samples obtained from a patient before and after treatment.

METHODS FOR DETECTING CANCER

In general, a cancer may be detected in a patient based on the presence of one or more prostate tumor proteins and/or polynucleotides encoding such proteins in a biological sample (for example, blood, sera, urine and/or tumor biopsies) obtained from the patient. In other words, such proteins may be used as markers to indicate the presence or absence of a cancer such as prostate cancer. In addition, such proteins may be useful for the detection of other cancers. The binding agents provided herein generally permit detection of the level of antigen that binds to the agent in the biological sample. Polynucleotide primers and probes may be used to detect the level of mRNA encoding a tumor protein, which is also indicative of the presence or absence of a cancer. In general, a prostate tumor sequence should be present at a level that is at least three fold higher in tumor tissue than in normal tissue

There are a variety of assay formats known to those of ordinary skill in the art for using a binding agent to detect polypeptide markers in a sample. See, e.g., Harlow and Lane, Antibodies: A Laboratory Manual, Cold Spring Harbor Laboratory, 1988. In general, the presence or absence of a cancer in a patient may be determined by (a) contacting a biological sample obtained from a patient with a binding agent; (b) detecting in the sample a level of polypeptide that binds to the binding agent; and (c) comparing the level of polypeptide with a predetermined cut-off value.

In a preferred embodiment, the assay involves the use of binding agent immobilized on a solid support to bind to and remove the polypeptide from the remainder of the sample. The bound polypeptide may then be detected using a detection reagent that contains a reporter group and specifically binds to the binding agent/polypeptide complex. Such detection reagents may comprise, for example, a binding agent that specifically binds to the polypeptide or an antibody or other agent that specifically binds to the binding agent, such as an anti-immunoglobulin, protein G, protein A or a lectin. Alternatively, a competitive assay may be utilized, in which a polypeptide is labeled with a reporter group and allowed to bind to the immobilized binding agent after incubation of the binding agent with the sample. The extent to which components of the sample inhibit the binding of the labeled polypeptide to the binding agent is indicative of the reactivity of the sample with the immobilized binding

agent. Suitable polypeptides for use within such assays include full length prostate tumor proteins and portions thereof to which the binding agent binds, as described above.

The solid support may be any material known to those of ordinary skill in the art to which the tumor protein may be attached. For example, the solid support may be a test well in a microtiter plate or a nitrocellulose or other suitable membrane. Alternatively, the support may be a bead or disc, such as glass, fiberglass, latex or a plastic material such as polystyrene or polyvinylchloride. The support may also be a magnetic particle or a fiber optic sensor, such as those disclosed, for example, in U.S. Patent No. 5,359,681. The binding agent may be immobilized on the solid support using a variety of techniques known to those of skill in the art, which are amply described in the patent and scientific literature. In the context of the present invention, the term "immobilization" refers to both noncovalent association, such as adsorption, and covalent attachment (which may be a direct linkage between the agent and functional groups on the support or may be a linkage by way of a cross-linking agent). Immobilization by adsorption to a well in a microtiter plate or to a membrane is preferred. In such cases, adsorption may be achieved by contacting the binding agent, in a suitable buffer, with the solid support for a suitable amount of time. The contact time varies with temperature, but is typically between about 1 hour and about 1 day. In general, contacting a well of a plastic microtiter plate (such as polystyrene or polyvinylchloride) with an amount of binding agent ranging from about 10 ng to about 10 µg, and preferably about 100 ng to about 1 µg, is sufficient to immobilize an adequate amount of binding agent.

Covalent attachment of binding agent to a solid support may generally be achieved by first reacting the support with a bifunctional reagent that will react with both the support and a functional group, such as a hydroxyl or amino group, on the binding agent. For example, the binding agent may be covalently attached to supports having an appropriate polymer coating using benzoquinone or by condensation of an aldehyde group on the support with an amine and an active hydrogen on the binding partner (see, e.g., Pierce Immunotechnology Catalog and Handbook, 1991, at A12-A13).

In certain embodiments, the assay is a two-antibody sandwich assay. This assay may be performed by first contacting an antibody that has been immobilized on a solid support, commonly the well of a microtiter plate, with the sample, such that polypeptides within the sample are allowed to bind to the immobilized antibody. Unbound sample is then removed from the immobilized polypeptide-antibody complexes and a detection reagent (preferably a second antibody capable of binding to a different site on the polypeptide) containing a reporter group is added. The amount of detection reagent that remains bound to the solid support is then determined using a method appropriate for the specific reporter group.

More specifically, once the antibody is immobilized on the support as described above, the remaining protein binding sites on the support are typically blocked. Any suitable blocking agent known to those of ordinary skill in the art, such as bovine serum albumin or Tween 20™ (Sigma Chemical Co., St. Louis, MO). The immobilized antibody is then incubated with the sample, and polypeptide is allowed to bind to the antibody. The sample may be diluted with a suitable diluent, such as phosphate-buffered saline (PBS) prior to incubation. In general, an appropriate contact time (*i.e.*, incubation time) is a period of time that is sufficient to detect the presence of polypeptide within a sample obtained from an individual with prostate cancer. Preferably, the contact time is sufficient to achieve a level of binding that is at least about 95% of that achieved at equilibrium between bound and unbound polypeptide. Those of ordinary skill in the art will recognize that the time necessary to achieve equilibrium may be readily determined by assaying the level of binding that occurs over a period of time. At room temperature, an incubation time of about 30 minutes is generally sufficient.

Unbound sample may then be removed by washing the solid support with an appropriate buffer, such as PBS containing 0.1% Tween 20™. The second antibody, which contains a reporter group, may then be added to the solid support. Preferred reporter groups include those groups recited above.

The detection reagent is then incubated with the immobilized antibody-polypeptide complex for an amount of time sufficient to detect the bound polypeptide. An appropriate amount of time may generally be determined by assaying the level of binding that occurs over a period of time. Unbound detection reagent is then removed and bound detection reagent is detected using the reporter group. The method employed for detecting the reporter group depends upon the nature of the reporter group. For radioactive groups, scintillation counting or autoradiographic methods are generally appropriate. Spectroscopic methods may be used to detect dyes, luminescent groups and fluorescent groups. Biotin may be detected using avidin, coupled to a different reporter group (commonly a radioactive or fluorescent group or an enzyme). Enzyme reporter groups may generally be detected by the addition of substrate (generally for a specific period of time), followed by spectroscopic or other analysis of the reaction products.

To determine the presence or absence of a cancer, such as prostate cancer, the signal detected from the reporter group that remains bound to the solid support is generally compared to a signal that corresponds to a predetermined cut-off value. In one preferred embodiment, the cut-off value for the detection of a cancer is the average mean signal obtained when the immobilized antibody is incubated with samples from patients without the cancer. In general, a sample generating a signal that is three standard deviations above the predetermined cut-off value is considered positive for the cancer. In an alternate preferred

embodiment, the cut-off value is determined using a Receiver Operator Curve, according to the method of Sackett et al., *Clinical Epidemiology: A Basic Science for Clinical Medicine*, Little Brown and Co., 1985, p. 106-7. Briefly, in this embodiment, the cut-off value may be determined from a plot of pairs of true positive rates (*i.e.*, sensitivity) and false positive rates (100%-specificity) that correspond to each possible cut-off value for the diagnostic test result. The cut-off value on the plot that is the closest to the upper left-hand corner (*i.e.*, the value that encloses the largest area) is the most accurate cut-off value, and a sample generating a signal that is higher than the cut-off value determined by this method may be considered positive. Alternatively, the cut-off value may be shifted to the left along the plot, to minimize the false positive rate, or to the right, to minimize the false negative rate. In general, a sample generating a signal that is higher than the cut-off value determined by this method is considered positive for a cancer.

In a related embodiment, the assay is performed in a flow-through or strip test format, wherein the binding agent is immobilized on a membrane, such as nitrocellulose. In the flow-through test, polypeptides within the sample bind to the immobilized binding agent as the sample passes through the membrane. A second, labeled binding agent then binds to the binding agent-polypeptide complex as a solution containing the second binding agent flows through the membrane. The detection of bound second binding agent may then be performed as described above. In the strip test format, one end of the membrane to which binding agent is bound is immersed in a solution containing the sample. The sample migrates along the membrane through a region containing second binding agent and to the area of immobilized binding agent. Concentration of second binding agent at the area of immobilized antibody indicates the presence of a cancer. Typically, the concentration of second binding agent at that site generates a pattern, such as a line, that can be read visually. The absence of such a pattern indicates a negative result. In general, the amount of binding agent immobilized on the membrane is selected to generate a visually discernible pattern when the biological sample contains a level of polypeptide that would be sufficient to generate a positive signal in the two-antibody sandwich assay, in the format discussed above. Preferred binding agents for use in such assays are antibodies and antigen-binding fragments thereof. Preferably, the amount of antibody immobilized on the membrane ranges from about 25 ng to about 1μg, and more preferably from about 50 ng to about 500 ng. Such tests can typically be performed with a very small amount of biological sample.

Of course, numerous other assay protocols exist that are suitable for use with the tumor proteins or binding agents of the present invention. The above descriptions are intended to be exemplary only. For example, it will be apparent to those of ordinary skill in the art that the above protocols may be readily modified to use prostate tumor polypeptides to

detect antibodies that bind to such polypeptides in a biological sample. The detection of such prostate tumor protein specific antibodies may correlate with the presence of a cancer.

A cancer may also, or alternatively, be detected based on the presence of T cells that specifically react with a prostate tumor protein in a biological sample. Within certain methods, a biological sample comprising $CD4^+$ and/or $CD8^+$ T cells isolated from a patient is incubated with a prostate tumor polypeptide, a polynucleotide encoding such a polypeptide and/or an APC that expresses at least an immunogenic portion of such a polypeptide, and the presence or absence of specific activation of the T cells is detected. Suitable biological samples include, but are not limited to, isolated T cells. For example, T cells may be isolated from a patient by routine techniques (such as by Ficoll/Hypaque density gradient centrifugation of peripheral blood lymphocytes). T cells may be incubated *in vitro* for 2-9 days (typically 4 days) at 37°C with prostate tumor polypeptide (*e.g.*, 5 - 25 µg/ml). It may be desirable to incubate another aliquot of a T cell sample in the absence of prostate tumor polypeptide to serve as a control. For $CD4^+$ T cells, activation is preferably detected by evaluating proliferation of the T cells. For $CD8^+$ T cells, activation is preferably detected by evaluating cytolytic activity. A level of proliferation that is at least two fold greater and/or a level of cytolytic activity that is at least 20% greater than in disease-free patients indicates the presence of a cancer in the patient.

As noted above, a cancer may also, or alternatively, be detected based on the level of mRNA encoding a prostate tumor protein in a biological sample. For example, at least two oligonucleotide primers may be employed in a polymerase chain reaction (PCR) based assay to amplify a portion of a prostate tumor cDNA derived from a biological sample, wherein at least one of the oligonucleotide primers is specific for (*i.e.*, hybridizes to) a polynucleotide encoding the prostate tumor protein. The amplified cDNA is then separated and detected using techniques well known in the art, such as gel electrophoresis. Similarly, oligonucleotide probes that specifically hybridize to a polynucleotide encoding a prostate tumor protein may be used in a hybridization assay to detect the presence of polynucleotide encoding the tumor protein in a biological sample.

To permit hybridization under assay conditions, oligonucleotide primers and probes should comprise an oligonucleotide sequence that has at least about 60%, preferably at least about 75% and more preferably at least about 90%, identity to a portion of a polynucleotide encoding a prostate tumor protein that is at least 10 nucleotides, and preferably at least 20 nucleotides, in length. Preferably, oligonucleotide primers and/or probes will hybridize to a polynucleotide encoding a polypeptide disclosed herein under moderately stringent conditions, as defined above. Oligonucleotide primers and/or probes which may be usefully employed in the diagnostic methods described herein preferably are at least 10-40 nucleotides in length. In a preferred embodiment, the oligonucleotide primers

comprise at least 10 contiguous nucleotides, more preferably at least 15 contiguous nucleotides, of a DNA molecule having a sequence recited in SEQ ID NO: 1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375 and 381. Techniques for both PCR based assays and hybridization assays are well known in the art (see, for example, Mullis et al., *Cold Spring Harbor Symp. Quant. Biol.*, *51*:263, 1987; Erlich ed., *PCR Technology*, Stockton Press, NY, 1989).

One preferred assay employs RT-PCR, in which PCR is applied in conjunction with reverse transcription. Typically, RNA is extracted from a biological sample, such as biopsy tissue, and is reverse transcribed to produce cDNA molecules. PCR amplification using at least one specific primer generates a cDNA molecule, which may be separated and visualized using, for example, gel electrophoresis. Amplification may be performed on biological samples taken from a test patient and from an individual who is not afflicted with a cancer. The amplification reaction may be performed on several dilutions of cDNA spanning two orders of magnitude. A two-fold or greater increase in expression in several dilutions of the test patient sample as compared to the same dilutions of the non-cancerous sample is typically considered positive.

In another embodiment, the disclosed compositions may be used as markers for the progression of cancer. In this embodiment, assays as described above for the diagnosis of a cancer may be performed over time, and the change in the level of reactive polypeptide(s) or polynucleotide evaluated. For example, the assays may be performed every 24-72 hours for a period of 6 months to 1 year, and thereafter performed as needed. In general, a cancer is progressing in those patients in whom the level of polypeptide or polynucleotide detected increases over time. In contrast, the cancer is not progressing when the level of reactive polypeptide or polynucleotide either remains constant or decreases with time.

Certain *in vivo* diagnostic assays may be performed directly on a tumor. One such assay involves contacting tumor cells with a binding agent. The bound binding agent may then be detected directly or indirectly via a reporter group. Such binding agents may also be used in histological applications. Alternatively, polynucleotide probes may be used within such applications.

As noted above, to improve sensitivity, multiple prostate tumor protein markers may be assayed within a given sample. It will be apparent that binding agents specific for different proteins provided herein may be combined within a single assay. Further, multiple primers or probes may be used concurrently. The selection of tumor protein markers may be based on routine experiments to determine combinations that results in optimal sensitivity. In addition, or alternatively, assays for tumor proteins provided herein may be combined with assays for other known tumor antigens.

DIAGNOSTIC KITS

The present invention further provides kits for use within any of the above diagnostic methods. Such kits typically comprise two or more components necessary for performing a diagnostic assay. Components may be compounds, reagents, containers and/or equipment. For example, one container within a kit may contain a monoclonal antibody or fragment thereof that specifically binds to a prostate tumor protein. Such antibodies or fragments may be provided attached to a support material, as described above. One or more additional containers may enclose elements, such as reagents or buffers, to be used in the assay. Such kits may also, or alternatively, contain a detection reagent as described above that contains a reporter group suitable for direct or indirect detection of antibody binding.

Alternatively, a kit may be designed to detect the level of mRNA encoding a prostate tumor protein in a biological sample. Such kits generally comprise at least one oligonucleotide probe or primer, as described above, that hybridizes to a polynucleotide encoding a prostate tumor protein. Such an oligonucleotide may be used, for example, within a PCR or hybridization assay. Additional components that may be present within such kits include a second oligonucleotide and/or a diagnostic reagent or container to facilitate the detection of a polynucleotide encoding a prostate tumor protein.

The following Examples are offered by way of illustration and not by way of limitation.

EXAMPLES

EXAMPLE 1
ISOLATION AND CHARACTERIZATION OF PROSTATE TUMOR POLYPEPTIDES

This Example describes the isolation of certain prostate tumor polypeptides from a prostate tumor cDNA library.

A human prostate tumor cDNA expression library was constructed from prostate tumor poly A⁺ RNA using a Superscript Plasmid System for cDNA Synthesis and Plasmid Cloning kit (BRL Life Technologies, Gaithersburg, MD 20897) following the manufacturer's protocol. Specifically, prostate tumor tissues were homogenized with polytron (Kinematica, Switzerland) and total RNA was extracted using Trizol reagent (BRL Life Technologies) as directed by the manufacturer. The poly A⁺ RNA was then purified using a Qiagen oligotex spin column mRNA purification kit (Qiagen, Santa Clarita, CA 91355) according to the manufacturer's protocol. First-strand cDNA was synthesized using the NotI/Oligo-dT18 primer. Double-stranded cDNA was synthesized, ligated with EcoRI/BAXI adaptors (Invitrogen, San Diego, CA) and digested with NotI. Following size fractionation with Chroma Spin-1000 columns (Clontech, Palo Alto, CA), the cDNA was ligated into the EcoRI/NotI site of pCDNA3.1 (Invitrogen) and transformed into ElectroMax *E. coli* DH10B cells (BRL Life Technologies) by electroporation.

Using the same procedure, a normal human pancreas cDNA expression library was prepared from a pool of six tissue specimens (Clontech). The cDNA libraries were characterized by determining the number of independent colonies, the percentage of clones that carried insert, the average insert size and by sequence analysis. The prostate tumor library contained 1.64 x 10⁷ independent colonies, with 70% of clones having an insert and the average insert size being 1745 base pairs. The normal pancreas cDNA library contained 3.3 x 10⁶ independent colonies, with 69% of clones having inserts and the average insert size being 1120 base pairs. For both libraries, sequence analysis showed that the majority of clones had a full length cDNA sequence and were synthesized from mRNA, with minimal rRNA and mitochondrial DNA contamination.

cDNA library subtraction was performed using the above prostate tumor and normal pancreas cDNA libraries, as described by Hara *et al.* (*Blood, 84*:189-199, 1994) with some modifications. Specifically, a prostate tumor-specific subtracted cDNA library was generated as follows. Normal pancreas cDNA library (70 μg) was digested with EcoRI, NotI, and SfuI, followed by a filling-in reaction with DNA polymerase Klenow fragment. After phenol-chloroform extraction and ethanol precipitation, the DNA was dissolved in 100 μl of

H$_2$O, heat-denatured and mixed with 100 μl (100 μg) of Photoprobe biotin (Vector Laboratories, Burlingame, CA). As recommended by the manufacturer, the resulting mixture was irradiated with a 270 W sunlamp on ice for 20 minutes. Additional Photoprobe biotin (50 μl) was added and the biotinylation reaction was repeated. After extraction with butanol five times, the DNA was ethanol-precipitated and dissolved in 23 μl H$_2$O to form the driver DNA.

To form the tracer DNA, 10 μg prostate tumor cDNA library was digested with BamHI and XhoI, phenol chloroform extracted and passed through Chroma spin-400 columns (Clontech). Following ethanol precipitation, the tracer DNA was dissolved in 5 μl H$_2$O. Tracer DNA was mixed with 15 μl driver DNA and 20 μl of 2 x hybridization buffer (1.5 M NaCl/10 mM EDTA/50 mM HEPES pH 7.5/0.2% sodium dodecyl sulfate), overlaid with mineral oil, and heat-denatured completely. The sample was immediately transferred into a 68 °C water bath and incubated for 20 hours (long hybridization {LH]). The reaction mixture was then subjected to a streptavidin treatment followed by phenol/chloroform extraction. This process was repeated three more times. Subtracted DNA was precipitated, dissolved in 12 μl H$_2$O, mixed with 8 μl driver DNA and 20 μl of 2 x hybridization buffer, and subjected to a hybridization at 68 °C for 2 hours (short hybridization [SH]). After removal of biotinylated double-stranded DNA, subtracted cDNA was ligated into BamHI/XhoI site of chloramphenicol resistant pBCSK$^+$ (Stratagene, La Jolla, CA 92037) and transformed into ElectroMax E. coli DH10B cells by electroporation to generate a prostate tumor specific subtracted cDNA library (referred to as "prostate subtraction 1").

To analyze the subtracted cDNA library, plasmid DNA was prepared from 100 independent clones, randomly picked from the subtracted prostate tumor specific library and grouped based on insert size. Representative cDNA clones were further characterized by DNA sequencing with a Perkin Elmer/Applied Biosystems Division Automated Sequencer Model 373A (Foster City, CA). Six cDNA clones, hereinafter referred to as F1-13, F1-12, F1-16, H1-1, H1-9 and H1-4, were shown to be abundant in the subtracted prostate-specific cDNA library. The determined 3' and 5' cDNA sequences for F1-12 are provided in SEQ ID NO: 2 and 3, respectively, with determined 3' cDNA sequences for F1-13, F1-16, H1-1, H1-9 and H1-4 being provided in SEQ ID NO: 1 and 4-7, respectively.

The cDNA sequences for the isolated clones were compared to known sequences in the gene bank using the EMBL and GenBank databases (release 96). Four of the prostate tumor cDNA clones, F1-13, F1-16, H1-1, and H1-4, were determined to encode the following previously identified proteins: prostate specific antigen (PSA), human glandular kallikrein, human tumor expression enhanced gene, and mitochondria cytochrome C oxidase subunit II. H1-9 was found to be identical to a previously identified human

autonomously replicating sequence. No significant homologies to the cDNA sequence for F1-12 were found.

Subsequent studies led to the isolation of a full-length cDNA sequence for F1-12. This sequence is provided in SEQ ID NO: 107, with the corresponding predicted amino acid sequence being provided in SEQ ID NO: 108.

To clone less abundant prostate tumor specific genes, cDNA library subtraction was performed by subtracting the prostate tumor cDNA library described above with the normal pancreas cDNA library and with the three most abundant genes in the previously subtracted prostate tumor specific cDNA library: human glandular kallikrein, prostate specific antigen (PSA), and mitochondria cytochrome C oxidase subunit II. Specifically, 1 µg each of human glandular kallikrein, PSA and mitochondria cytochrome C oxidase subunit II cDNAs in pCDNA3.1 were added to the driver DNA and subtraction was performed as described above to provide a second subtracted cDNA library hereinafter referred to as the "subtracted prostate tumor specific cDNA library with spike".

Twenty-two cDNA clones were isolated from the subtracted prostate tumor specific cDNA library with spike. The determined 3' and 5' cDNA sequences for the clones referred to as J1-17, L1-12, N1-1862, J1-13, J1-19, J1-25. J1-24, K1-58, K1-63, L1-4 and L1-14 are provided in SEQ ID NOS: 8-9, 10-11, 12-13, 14-15, 16-17, 18-19, 20-21, 22-23, 24-25, 26-27 and 28-29, respectively. The determined 3' cDNA sequences for the clones referred to as J1-12, J1-16, J1-21, K1-48, K1-55, L1-2, L1-6, N1-1858, N1-1860, N1-1861, N1-1864 are provided in SEQ ID NOS: 30-40, respectively. Comparison of these sequences with those in the gene bank as described above, revealed no significant homologies to three of the five most abundant DNA species, (J1-17, L1-12 and N1-1862; SEQ ID NOS: 8-9, 10-11 and 12-13, respectively). Of the remaining two most abundant species, one (J1-12; SEQ ID NO:30) was found to be identical to the previously identified human pulmonary surfactant-associated protein, and the other (K1-48; SEQ ID NO:33) was determined to have some homology to *R. norvegicus* mRNA for 2-arylpropionyl-CoA epimerase. Of the 17 less abundant cDNA clones isolated from the subtracted prostate tumor specific cDNA library with spike, four (J1-16, K1-55, L1-6 and N1-1864; SEQ ID NOS:31, 34, 36 and 40, respectively) were found to be identical to previously identified sequences, two (J1-21 and N1-1860; SEQ ID NOS: 32 and 38, respectively) were found to show some homology to non-human sequences, and two (L1-2 and N1-1861; SEQ ID NOS: 35 and 39, respectively) were found to show some homology to known human sequences. No significant homologies were found to the polypeptides J1-13, J1-19, J1-24, J1-25, K1-58, K1-63, L1-4, L1-14 (SEQ ID NOS: 14-15, 16-17, 20-21, 18-19, 22-23, 24-25, 26-27, 28-29, respectively).

Subsequent studies led to the isolation of full length cDNA sequences for J1-17, L1-12 and N1-1862 (SEQ ID NOS: 109-111, respectively). The corresponding predicted

amino acid sequences are provided in SEQ ID NOS: 112-114. L1-12 is also referred to as P501S.

In a further experiment, four additional clones were identified by subtracting a prostate tumor cDNA library with normal prostate cDNA prepared from a pool of three normal prostate poly A+ RNA (referred to as "prostate subtraction 2"). The determined cDNA sequences for these clones, hereinafter referred to as U1-3064, U1-3065, V1-3692 and 1A-3905, are provided in SEQ ID NO: 69-72, respectively. Comparison of the determined sequences with those in the gene bank revealed no significant homologies to U1-3065.

A second subtraction with spike (referred to as "prostate subtraction spike 2") was performed by subtracting a prostate tumor specific cDNA library with spike with normal pancreas cDNA library and further spiked with PSA, J1-17, pulmonary surfactant-associated protein, mitochondrial DNA, cytochrome c oxidase subunit II, N1-1862, autonomously replicating sequence, L1-12 and tumor expression enhanced gene. Four additional clones, hereinafter referred to as V1-3686, R1-2330, 1B-3976 and V1-3679, were isolated. The determined cDNA sequences for these clones are provided in SEQ ID NO:73-76, respectively. Comparison of these sequences with those in the gene bank revealed no significant homologies to V1-3686 and R1-2330.

Further analysis of the three prostate subtractions described above (prostate subtraction 2, subtracted prostate tumor specific cDNA library with spike, and prostate subtraction spike 2) resulted in the identification of sixteen additional clones, referred to as 1G-4736, 1G-4738, 1G-4741, 1G-4744, 1G-4734, 1H-4774, 1H-4781, 1H-4785, 1H-4787, 1H-4796, 1I-4810, 1I-4811, 1J-4876, 1K-4884 and 1K-4896. The determined cDNA sequences for these clones are provided in SEQ ID NOS: 77-92, respectively. Comparison of these sequences with those in the gene bank as described above, revealed no significant homologies to 1G-4741, 1G-4734, 1I-4807, 1J-4876 and 1K-4896 (SEQ ID NOS: 79, 81, 87, 90 and 92, respectively). Further analysis of the isolated clones led to the determination of extended cDNA sequences for 1G-4736, 1G-4738, 1G-4741, 1G-4744, 1H-4774, 1H-4781, 1H-4785, 1H-4787, 1H-4796, 1I-4807, 1J-4876, 1K-4884 and 1K-4896, provided in SEQ ID NOS: 179-188 and 191-193, respectively, and to the determination of additional partial cDNA sequences for 1I-4810 and 1I-4811, provided in SEQ ID NOS: 189 and 190, respectively.

Additional studies with prostate subtraction spike 2 resulted in the isolation of three more clones. Their sequences were determined as described above and compared to the most recent GenBank. All three clones were found to have homology to known genes, which are Cysteine-rich protein, KIAA0242, and KIAA0280 (SEQ ID NO: 317, 319, and 320, respectively). Further analysis of these clones by Synteni microarray (Synteni, Palo Alto, CA) demonstrated that all three clones were over-expressed in most prostate tumors and

prostate BPH, as well as in the majority of normal prostate tissues tested, but low expression in all other normal tissues.

An additional subtraction was performed by subtracting a normal prostate cDNA library with normal pancreas cDNA (referred to as "prostate subtraction 3"). This led to the identification of six additional clones referred to as 1G-4761, 1G-4762, 1H-4766, 1H-4770, 1H-4771 and 1H-4772 (SEQ ID NOS: 93-98). Comparison of these sequences with those in the gene bank revealed no significant homologies to 1G-4761 and 1H-4771 (SEQ ID NOS: 93 and 97, respectively). Further analysis of the isolated clones led to the determination of extended cDNA sequences for 1G-4761, 1G-4762, 1H-4766 and 1H-4772 provided in SEQ ID NOS: 194-196 and 199, respectively, and to the determination of additional partial cDNA sequences for 1H-4770 and 1H-4771, provided in SEQ ID NOS: 197 and 198, respectively.

Subtraction of a prostate tumor cDNA library, prepared from a pool of polyA+ RNA from three prostate cancer patients, with a normal pancreas cDNA library (prostate subtraction 4) led to the identification of eight clones, referred to as 1D-4297, 1D-4309, 1D.1-4278, 1D-4288, 1D-4283, 1D-4304, 1D-4296 and 1D-4280 (SEQ ID NOS: 99-107). These sequences were compared to those in the gene bank as described above. No significant homologies were found to 1D-4283 and 1D-4304 (SEQ ID NOS: 103 and 104, respectively). Further analysis of the isolated clones led to the determination of extended cDNA sequences for 1D-4309, 1D.1-4278, 1D-4288, 1D-4283, 1D-4304, 1D-4296 and 1D-4280, provided in SEQ ID NOS: 200-206, respectively.

cDNA clones isolated in prostate subtraction 1 and prostate subtraction 2, described above, were colony PCR amplified and their mRNA expression levels in prostate tumor, normal prostate and in various other normal tissues were determined using microarray technology (Synteni, Palo Alto, CA). Briefly, the PCR amplification products were dotted onto slides in an array format, with each product occupying a unique location in the array. mRNA was extracted from the tissue sample to be tested, reverse transcribed, and fluorescent-labeled cDNA probes were generated. The microarrays were probed with the labeled cDNA probes, the slides scanned and fluorescence intensity was measured. This intensity correlates with the hybridization intensity. Two clones (referred to as P509S and P510S) were found to be over-expressed in prostate tumor and normal prostate and expressed at low levels in all other normal tissues tested (liver, pancreas, skin, bone marrow, brain, breast, adrenal gland, bladder, testes, salivary gland, large intestine, kidney, ovary, lung, spinal cord, skeletal muscle and colon). The determined cDNA sequences for P509S and P510S are provided in SEQ ID NO: 223 and 224, respectively. Comparison of these sequences with those in the gene bank as described above, revealed some homology to previously identified ESTs.

Additional, studies led to the isolation of the full-length cDNA sequence for P509S. This sequence is provided in SEQ ID NO: 332, with the corresponding predicted amino acid sequence being provided in SEQ ID NO: 339.

EXAMPLE 2
DETERMINATION OF TISSUE SPECIFICITY OF PROSTATE TUMOR POLYPEPTIDES

Using gene specific primers, mRNA expression levels for the representative prostate tumor polypeptides F1-16, H1-1, J1-17 (also referred to as P502S), L1-12 (also referred to as P501S), F1-12 (also referred to as P504S) and N1-1862 (also referred to as P503S) were examined in a variety of normal and tumor tissues using RT-PCR.

Briefly, total RNA was extracted from a variety of normal and tumor tissues using Trizol reagent as described above. First strand synthesis was carried out using 1-2 μg of total RNA with SuperScript II reverse transcriptase (BRL Life Technologies) at 42 °C for one hour. The cDNA was then amplified by PCR with gene-specific primers. To ensure the semi-quantitative nature of the RT-PCR, β-actin was used as an internal control for each of the tissues examined. First, serial dilutions of the first strand cDNAs were prepared and RT-PCR assays were performed using β-actin specific primers. A dilution was then chosen that enabled the linear range amplification of the β-actin template and which was sensitive enough to reflect the differences in the initial copy numbers. Using these conditions, the β-actin levels were determined for each reverse transcription reaction from each tissue. DNA contamination was minimized by DNase treatment and by assuring a negative PCR result when using first strand cDNA that was prepared without adding reverse transcriptase.

mRNA Expression levels were examined in four different types of tumor tissue (prostate tumor from 2 patients, breast tumor from 3 patients, colon tumor, lung tumor), and sixteen different normal tissues, including prostate, colon, kidney, liver, lung, ovary, pancreas, skeletal muscle, skin, stomach, testes, bone marrow and brain. F1-16 was found to be expressed at high levels in prostate tumor tissue, colon tumor and normal prostate, and at lower levels in normal liver, skin and testes, with expression being undetectable in the other tissues examined. H1-1 was found to be expressed at high levels in prostate tumor, lung tumor, breast tumor, normal prostate, normal colon and normal brain, at much lower levels in normal lung, pancreas, skeletal muscle, skin, small intestine, bone marrow, and was not detected in the other tissues tested. J1-17 (P502S) and L1-12 (P501S) appear to be specifically over-expressed in prostate, with both genes being expressed at high levels in prostate tumor and normal prostate but at low to undetectable levels in all the other tissues examined. N1-1862 (P503S) was found to be over-expressed in 60% of prostate tumors and detectable in normal colon and kidney. The RT-PCR results thus indicate that

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F1-16, H1-1, J1-17 (P502S), N1-1862 (P503S) and L1-12 (P501S) are either prostate specific or are expressed at significantly elevated levels in prostate.

Further RT-PCR studies showed that F1-12 (P504S) is over-expressed in 60% of prostate tumors, detectable in normal kidney but not detectable in all other tissues tested. Similarly, R1-2330 was shown to be over-expressed in 40% of prostate tumors, detectable in normal kidney and liver, but not detectable in all other tissues tested. U1-3064 was found to be over-expressed in 60% of prostate tumors, and also expressed in breast and colon tumors, but was not detectable in normal tissues.

RT-PCR characterization of R1-2330, U1-3064 and 1D-4279 showed that these three antigens are over-expressed in prostate and/or prostate tumors.

Northern analysis with four prostate tumors, two normal prostate samples, two BPH prostates, and normal colon, kidney, liver, lung, pancrease, skeletal muscle, brain, stomach, testes, small intestine and bone marrow, showed that L1-12 (P501S) is over-expressed in prostate tumors and normal prostate, while being undetectable in other normal tissues tested. J1-17 (P502S) was detected in two prostate tumors and not in the other tissues tested. N1-1862 (P503S) was found to be over-expressed in three prostate tumors and to be expressed in normal prostate, colon and kidney, but not in other tissues tested. F1-12 (P504S) was found to be highly expressed in two prostate tumors and to be undetectable in all other tissues tested.

The microarray technology described above was used to determine the expression levels of representative antigens described herein in prostate tumor, breast tumor and the following normal tissues: prostate, liver, pancreas, skin, bone marrow, brain, breast, adrenal gland, bladder, testes, salivary gland, large intestine, kidney, ovary, lung, spinal cord, skeletal muscle and colon. L1-12 (P501S) was found to be over-expressed in normal prostate and prostate tumor, with some expression being detected in normal skeletal muscle. Both J1-12 and F1-12 (P504S) were found to be over-expressed in prostate tumor, with expression being lower or undetectable in all other tissues tested. N1-1862 (P503S) was found to be expressed at high levels in prostate tumor and normal prostate, and at low levels in normal large intestine and normal colon, with expression being undetectable in all other tissues tested. R1-2330 was found to be over-expressed in prostate tumor and normal prostate, and to be expressed at lower levels in all other tissues tested. 1D-4279 was found to be over-expressed in prostate tumor and normal prostate, expressed at lower levels in normal spinal cord, and to be undetectable in all other tissues tested.

Further microarray analysis to specifically address the extent to which P501S (SEQ ID NO: 110) was expressed in breast tumor revealed moderate over-expression not only in breast tumor, but also in metastatic breast tumor (2/31), with negligible to low expression

in normal tissues. This data suggests that P501S may be over-expressed in various breast tumors as well as in prostate tumors.

The expression levels of 32 ESTs (expressed sequence tags) described by Vasmatzis *et al.* (*Proc. Natl. Acad. Sci. USA* 95:300-304, 1998) in a variety of tumor and normal tissues were examined by microarray technology as described above. Two of these clones (referred to as P1000C and P1001C) were found to be over-expressed in prostate tumor and normal prostate, and expressed at low to undetectable levels in all other tissues tested (normal aorta, thymus, resting and activated PBMC, epithelial cells, spinal cord, adrenal gland, fetal tissues, skin, salivary gland, large intestine, bone marrow, liver, lung, dendritic cells, stomach, lymph nodes, brain, heart, small intestine, skeletal muscle, colon and kidney. The determined cDNA sequences for P1000C and P1001C are provided in SEQ ID NO: 384 and 472, respectively. The sequence of P1001C was found to show some homology to the previously isolated Human mRNA for JM27 protein. No significant homologies were found to the sequence of P1000C.

The expression of the polypeptide encoded by the full length cDNA sequence for F1-12 (also referred to as P504S; SEQ ID NO: 108) was investigated by immunohistochemical analysis. Rabbit-anti-P504S polyclonal antibodies were generated against the full length P504S protein by standard techniques. Subsequent isolation and characterization of the polyclonal antibodies were also performed by techniques well known in the art. Immunohistochemical analysis showed that the P504S polypeptide was expressed in 100% of prostate carcinoma samples tested (n=5).

The rabbit-anti-P504S polyclonal antibody did not appear to label benign prostate cells with the same cytoplasmic granular staining, but rather with light nuclear staining. Analysis of normal tissues revealed that the encoded polypeptide was found to be expressed in some, but not all normal human tissues. Positive cytoplasmic staining with rabbit-anti-P504S polyclonal antibody was found in normal human kidney, liver, brain, colon and lung-associated macrophages, whereas heart and bone marrow were negative.

This data indicates that the P504S polypeptide is present in prostate cancer tissues, and that there are qualitative and quantitative differences in the staining between benign prostatic hyperplasia tissues and prostate cancer tissues, suggesting that this polypeptide may be detected selectively in prostate tumors and therefore be useful in the diagnosis of prostate cancer.

EXAMPLE 3
ISOLATION AND CHARACTERIZATION OF PROSTATE TUMOR POLYPEPTIDES
BY PCR-BASED SUBTRACTION

A cDNA subtraction library, containing cDNA from normal prostate subtracted with ten other normal tissue cDNAs (brain, heart, kidney, liver, lung, ovary, placenta, skeletal muscle, spleen and thymus) and then submitted to a first round of PCR amplification, was purchased from Clontech. This library was subjected to a second round of PCR amplification, following the manufacturer's protocol. The resulting cDNA fragments were subcloned into the vector pT7 Blue T-vector (Novagen, Madison, WI) and transformed into XL-1 Blue MRF' *E. coli* (Stratagene). DNA was isolated from independent clones and sequenced using a Perkin Elmer/Applied Biosystems Division Automated Sequencer Model 373A.

Fifty-nine positive clones were sequenced. Comparison of the DNA sequences of these clones with those in the gene bank, as described above, revealed no significant homologies to 25 of these clones, hereinafter referred to as P5, P8, P9, P18, P20, P30, P34, P36, P38, P39, P42, P49, P50, P53, P55, P60, P64, P65, P73, P75, P76, P79 and P84. The determined cDNA sequences for these clones are provided in SEQ ID NO: 41-45, 47-52 and 54-65, respectively. P29, P47, P68, P80 and P82 (SEQ ID NO: 46, 53 and 66-68, respectively) were found to show some degree of homology to previously identified DNA sequences. To the best of the inventors' knowledge, none of these sequences have been previously shown to be present in prostate.

Further studies using the PCR-based methodology described above resulted in the isolation of more than 180 additional clones, of which 23 clones were found to show no significant homologies to known sequences. The determined cDNA sequences for these clones are provided in SEQ ID NO: 115-123, 127, 131, 137, 145, 147-151, 153, 156-158 and 160. Twenty-three clones (SEQ ID NO: 124-126, 128-130, 132-136, 138-144, 146, 152, 154, 155 and 159) were found to show some homology to previously identified ESTs. An additional ten clones (SEQ ID NO: 161-170) were found to have some degree of homology to known genes. Larger cDNA clones containing the P20 sequence represent splice variants of a gene referred to as P703P. The determined DNA sequence for the variants referred to as DE1, DE13 and DE14 are provided in SEQ ID NOS: 171, 175 and 177, respectively, with the corresponding predicted amino acid sequences being provided in SEQ ID NO: 172, 176 and 178, respectively. The determined cDNA sequence for an extended spliced form of P703 is provided in SEQ ID NO: 225. The DNA sequences for the splice variants referred to as DE2 and DE6 are provided in SEQ ID NOS: 173 and 174, respectively.

mRNA Expression levels for representative clones in tumor tissues (prostate (n=5), breast (n=2), colon and lung) normal tissues (prostate (n=5), colon, kidney, liver, lung (n=2), ovary (n=2), skeletal muscle, skin, stomach, small intestine and brain), and activated

and non-activated PBMC was determined by RT-PCR as described above. Expression was examined in one sample of each tissue type unless otherwise indicated.

P9 was found to be highly expressed in normal prostate and prostate tumor compared to all normal tissues tested except for normal colon which showed comparable expression. P20, a portion of the P703P gene, was found to be highly expressed in normal prostate and prostate tumor, compared to all twelve normal tissues tested. A modest increase in expression of P20 in breast tumor (n=2), colon tumor and lung tumor was seen compared to all normal tissues except lung (1 of 2). Increased expression of P18 was found in normal prostate, prostate tumor and breast tumor compared to other normal tissues except lung and stomach. A modest increase in expression of P5 was observed in normal prostate compared to most other normal tissues. However, some elevated expression was seen in normal lung and PBMC. Elevated expression of P5 was also observed in prostate tumors (2 of 5), breast tumor and one lung tumor sample. For P30, similar expression levels were seen in normal prostate and prostate tumor, compared to six of twelve other normal tissues tested. Increased expression was seen in breast tumors, one lung tumor sample and one colon tumor sample, and also in normal PBMC. P29 was found to be over-expressed in prostate tumor (5 of 5) and normal prostate (5 of 5) compared to the majority of normal tissues. However, substantial expression of P29 was observed in normal colon and normal lung (2 of 2). P80 was found to be over-expressed in prostate tumor (5 of 5) and normal prostate (5 of 5) compared to all other normal tissues tested, with increased expression also being seen in colon tumor.

Further studies resulted in the isolation of twelve additional clones, hereinafter referred to as 10-d8, 10-h10, 11-c8, 7-g6, 8-b5, 8-b6, 8-d4, 8-d9, 8-g3, 8-h11, 9-f12 and 9-f3. The determined DNA sequences for 10-d8, 10-h10, 11-c8, 8-d4, 8-d9, 8-h11, 9-f12 and 9-f3 are provided in SEQ ID NO: 207, 208, 209, 216, 217, 220, 221 and 222, respectively. The determined forward and reverse DNA sequences for 7-g6, 8-b5, 8-b6 and 8-g3 are provided in SEQ ID NO: 210 and 211; 212 and 213; 214 and 215; and 218 and 219, respectively. Comparison of these sequences with those in the gene bank revealed no significant homologies to the sequence of 9-f3. The clones 10-d8, 11-c8 and 8-h11 were found to show some homology to previously isolated ESTs, while 10-h10, 8-b5, 8-b6, 8-d4, 8-d9, 8-g3 and 9-f12 were found to show some homology to previously identified genes. Further characterization of 7-G6 and 8-G3 showed identity to the known genes PAP and PSA, respectively.

mRNA expression levels for these clones were determined using the micro-array technology described above. The clones 7-G6, 8-G3, 8-B5, 8-B6, 8-D4, 8-D9, 9-F3, 9-F12, 9-H3, 10-A2, 10-A4, 11-C9 and 11-F2 were found to be over-expressed in prostate tumor and normal prostate, with expression in other tissues tested being low or undetectable.

Increased expression of 8-F11 was seen in prostate tumor and normal prostate, bladder, skeletal muscle and colon. Increased expression of 10-H10 was seen in prostate tumor and normal prostate, bladder, lung, colon, brain and large intestine. Increased expression of 9-B1 was seen in prostate tumor, breast tumor, and normal prostate, salivary gland, large intestine and skin, with increased expression of 11-C8 being seen in prostate tumor, and normal prostate and large intestine.

An additional cDNA fragment derived from the PCR-based normal prostate subtraction, described above, was found to be prostate specific by both micro-array technology and RT-PCR. The determined cDNA sequence of this clone (referred to as 9-A11) is provided in SEQ ID NO: 226. Comparison of this sequence with those in the public databases revealed 99% identity to the known gene HOXB13.

Further studies led to the isolation of the clones 8-C6 and 8-H7. The determined cDNA sequences for these clones are provided in SEQ ID NO: 227 and 228, respectively. These sequences were found to show some homology to previously isolated ESTs.

PCR and hybridization-based methodologies were employed to obtain longer cDNA sequences for clone P20 (also referred to as P703P), yielding three additional cDNA fragments that progressively extend the 5' end of the gene. These fragments, referred to as P703PDE5, P703P6.26, and P703PX-23 (SEQ ID NO: 326, 328 and 330, with the predicted corresponding amino acid sequences being provided in SEQ ID NO: 327, 329 and 331, respectively) contain additional 5' sequence. P703PDE5 was recovered by screening of a cDNA library (#141-26) with a portion of P703P as a probe. P703P6.26 was recovered from a mixture of three prostate tumor cDNAs and P703PX_23 was recovered from cDNA library (#438-48). Together, the additional sequences include all of the putative mature serine protease along with part of the putative signal sequence. Further studies using a PCR-based subtraction library of a prostate tumor pool subtracted against a pool of normal tissues (referred to as JP: PCR subtraction) resulted in the isolation of thirteen additional clones, seven of which did not share any significant homology to known GenBank sequences. The determined cDNA sequences for these seven clones (P711P, P712P, novel 23, P774P, P775P, P710P and P768P) are provided in SEQ ID NO: 307-311, 313 and 315, respectively. The remaining six clones (SEQ ID NO: 316 and 321-325) were shown to share some homology to known genes. By microarray analysis, all thirteen clones showed three or more fold over-expression in prostate tissues, including prostate tumors, BPH and normal prostate as compared to normal non-prostate tissues. Clones P711P, P712P, novel 23 and P768P showed over-expression in most prostate tumors and BPH tissues tested (n=29), and in the majority of normal prostate tissues (n=4), but background to low expression levels in all normal tissues.

Clones P774P, P775P and P710P showed comparatively lower expression and expression in fewer prostate tumors and BPH samples, with negative to low expression in normal prostate.

The full-length cDNA for P711P was obtained by employing the partial sequence of SEQ ID NO: 307 to screen a prostate cDNA library. Specifically, a directionally cloned prostate cDNA library was prepared using standard techniques. One million colonies of this library were plated onto LB/Amp plates. Nylon membrane filters were used to lift these colonies, and the cDNAs which were picked up by these filters were denatured and cross-linked to the filters by UV light. The P711P cDNA fragment of SEQ ID NO: 307 was radio-labeled and used to hybridize with these filters. Positive clones were selected, and cDNAs were prepared and sequenced using an automatic Perkin Elmer/Applied Biosystems sequencer. The determined full-length sequence of P711P is provided in SEQ ID NO: 382, with the corresponding predicted amino acid sequence being provided in SEQ ID NO: 383.

Using PCR and hybridization-based methodologies, additional cDNA sequence information was derived for two clones described above, 11-C9 and 9-F3, herein after referred to as P707P and P714P, respectively (SEQ ID NO: 333 and 334). After comparison with the most recent GenBank, P707P was found to be a splice variant of the known gene HoxB13. In contrast, no significant homologies to P714P were found.

Clones 8-B3, P89, P98, P130 and P201 (as disclosed in U.S. Patent Application No. 09/020,956, filed February 9, 1998) were found to be contained within one contiguous sequence, referred to as P705P (SEQ ID NO: 335, with the predicted amino acid sequence provided in SEQ ID NO: 336), which was determined to be a splice variant of the known gene NKX 3.1.

EXAMPLE 4

SYNTHESIS OF POLYPEPTIDES

Polypeptides may be synthesized on a Perkin Elmer/Applied Biosystems 430A peptide synthesizer using FMOC chemistry with HPTU (O-Benzotriazole-N,N,N',N'-tetramethyluronium hexafluorophosphate) activation. A Gly-Cys-Gly sequence may be attached to the amino terminus of the peptide to provide a method of conjugation, binding to an immobilized surface, or labeling of the peptide. Cleavage of the peptides from the solid support may be carried out using the following cleavage mixture: trifluoroacetic acid:ethanedithiol:thioanisole:water:phenol (40:1:2:2:3). After cleaving for 2 hours, the peptides may be precipitated in cold methyl-t-butyl-ether. The peptide pellets may then be dissolved in water containing 0.1% trifluoroacetic acid (TFA) and lyophilized prior to purification by C18 reverse phase HPLC. A gradient of 0%-60% acetonitrile (containing 0.1% TFA) in water (containing 0.1% TFA) may be used to elute the peptides. Following

lyophilization of the pure fractions, the peptides may be characterized using electrospray or other types of mass spectrometry and by amino acid analysis.

EXAMPLE 5
FURTHER ISOLATION AND CHARACTERIZATION OF PROSTATE TUMOR POLYPEPTIDES BY PCR-BASED SUBTRACTION

A cDNA library generated from prostate primary tumor mRNA as described above was subtracted with cDNA from normal prostate. The subtraction was performed using a PCR-based protocol (Clontech), which was modified to generate larger fragments. Within this protocol, tester and driver double stranded cDNA were separately digested with five restriction enzymes that recognize six-nucleotide restriction sites (MluI, MscI, PvuII, SalI and StuI). This digestion resulted in an average cDNA size of 600 bp, rather than the average size of 300 bp that results from digestion with RsaI according to the Clontech protocol. This modification did not affect the subtraction efficiency. Two tester populations were then created with different adapters, and the driver library remained without adapters.

The tester and driver libraries were then hybridized using excess driver cDNA. In the first hybridization step, driver was separately hybridized with each of the two tester cDNA populations. This resulted in populations of (a) unhybridized tester cDNAs, (b) tester cDNAs hybridized to other tester cDNAs, (c) tester cDNAs hybridized to driver cDNAs and (d) unhybridized driver cDNAs. The two separate hybridization reactions were then combined, and rehybridized in the presence of additional denatured driver cDNA. Following this second hybridization, in addition to populations (a) through (d), a fifth population (e) was generated in which tester cDNA with one adapter hybridized to tester cDNA with the second adapter. Accordingly, the second hybridization step resulted in enrichment of differentially expressed sequences which could be used as templates for PCR amplification with adaptor-specific primers.

The ends were then filled in, and PCR amplification was performed using adaptor-specific primers. Only population (e), which contained tester cDNA that did not hybridize to driver cDNA, was amplified exponentially. A second PCR amplification step was then performed, to reduce background and further enrich differentially expressed sequences.

This PCR-based subtraction technique normalizes differentially expressed cDNAs so that rare transcripts that are overexpressed in prostate tumor tissue may be recoverable. Such transcripts would be difficult to recover by traditional subtraction methods.

In addition to genes known to be overexpressed in prostate tumor, seventy-seven further clones were identified. Sequences of these partial cDNAs are provided in SEQ ID NO: 29 to 305. Most of these clones had no significant homology to database sequences. Exceptions were JPTPN23 (SEQ ID NO: 231; similarity to pig valosin-containing protein), JPTPN30 (SEQ ID NO: 234; similarity to rat mRNA for proteasome subunit), JPTPN45 (SEQ ID NO: 243; similarity to rat *norvegicus* cytosolic NADP-dependent isocitrate dehydrogenase), JPTPN46 (SEQ ID NO: 244; similarity to human subclone H8 4 d4 DNA sequence), JP1D6 (SEQ ID NO: 265; similarity to *G. gallus* dynein light chain-A), JP8D6 (SEQ ID NO: 288; similarity to human BAC clone RG016J04), JP8F5 (SEQ ID NO: 289; similarity to human subclone H8 3 b5 DNA sequence), and JP8E9 (SEQ ID NO: 299; similarity to human Alu sequence).

Additional studies using the PCR-based subtraction library consisting of a prostate tumor pool subtracted against a normal prostate pool (referred to as PT-PN PCR subtraction) yielded three additional clones. Comparison of the cDNA sequences of these clones with the most recent release of GenBank revealed no significant homologies to the two clones referred to as P715P and P767P (SEQ ID NO: 312 and 314). The remaining clone was found to show some homology to the known gene KIAA0056 (SEQ ID NO: 318). Using microarray analysis to measure mRNA expression levels in various tissues, all three clones were found to be over-expressed in prostate tumors and BPH tissues. Specifically, clone P715P was over-expressed in most prostate tumors and BPH tissues by a factor of three or greater, with elevated expression seen in the majority of normal prostate samples and in fetal tissue, but negative to low expression in all other normal tissues. Clone P767P was over-expressed in several prostate tumors and BPH tissues, with moderate expression levels in half of the normal prostate samples, and background to low expression in all other normal tissues tested.

Further analysis, by microarray as described above, of the PT-PN PCR subtraction library and of a DNA subtraction library containing cDNA from prostate tumor subtracted with a pool of normal tissue cDNAs, led to the isolation of 27 additional clones (SEQ ID NO: 340-365 and 381) which were determined to be over-expressed in prostate tumor. The clones of SEQ ID NO: 341, 342, 345, 347, 348, 349, 351, 355-359, 361, 362 and 364 were also found to be expressed in normal prostate. Expression of all 26 clones in a variety of normal tissues was found to be low or undetectable, with the exception of P544S (SEQ ID NO: 356) which was found to be expressed in small intestine. Of the 26 clones, 10 (SEQ ID NO: 340-349) were found to show some homology to previously identified sequences. No significant homologies were found to the clones of SEQ ID NO: 350-365.

EXAMPLE 6
PEPTIDE PRIMING OF MICE AND PROPAGATION OF CTL LINES

6.1. This Example illustrates the preparation of a CTL cell line specific for cells expressing the P502S gene.

Mice expressing the transgene for human HLA A2.1 (provided by Dr L. Sherman, The Scripps Research Institute, La Jolla, CA) were immunized with P2S#12 peptide (VLGWVAEL; SEQ ID NO: 306), which is derived from the P502S gene (also referred to herein as J1-17, SEQ ID NO: 8), as described by Theobald et al., *Proc. Natl. Acad. Sci. USA* 92:11993-11997, 1995 with the following modifications. Mice were immunized with 100µg of P2S#12 and 120µg of an I-A^b binding peptide derived from hepatitis B Virus protein emulsified in incomplete Freund's adjuvant. Three weeks later these mice were sacrificed and using a nylon mesh single cell suspensions prepared. Cells were then resuspended at 6 x 10^6 cells/ml in complete media (RPMI-1640; Gibco BRL, Gaithersburg, MD) containing 10% FCS, 2mM Glutamine (Gibco BRL), sodium pyruvate (Gibco BRL), non-essential amino acids (Gibco BRL), 2 x 10^{-5} M 2-mercaptoethanol, 50U/ml penicillin and streptomycin, and cultured in the presence of irradiated (3000 rads) P2S#12-pulsed (5mg/ml P2S#12 and 10mg/ml β2-microglobulin) LPS blasts (A2 transgenic spleens cells cultured in the presence of 7µg/ml dextran sulfate and 25µg/ml LPS for 3 days). Six days later, cells (5 x 10^5/ml) were restimulated with 2.5 x 10^6/ml peptide pulsed irradiated (20,000 rads) EL4A2Kb cells (Sherman et al, *Science* 258:815-818, 1992) and 3 x 10^6/ml A2 transgenic spleen feeder cells. Cells were cultured in the presence of 20U/ml IL-2. Cells continued to be restimulated on a weekly basis as described, in preparation for cloning the line.

P2S#12 line was cloned by limiting dilution analysis with peptide pulsed EL4 A2Kb tumor cells (1 x 10^4 cells/ well) as stimulators and A2 transgenic spleen cells as feeders (5 x 10^5 cells/ well) grown in the presence of 30U/ml IL-2. On day 14, cells were

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restimulated as before. On day 21, clones that were growing were isolated and maintained in culture. Several of these clones demonstrated significantly higher reactivity (lysis) against human fibroblasts (HLA A2.1 expressing) transduced with P502S than against control fibroblasts. An example is presented in Figure 1.

This data indicates that P2S #12 represents a naturally processed epitope of the P502S protein that is expressed in the context of the human HLA A2.1 molecule.

6.2. This Example illustrates the preparation of murine CTL lines and CTL clones specific for cells expressing the P501S gene.

This series of experiments were performed similarly to that described above. Mice were immunized with the P1S#10 peptide (SEQ ID NO: 337), which is derived from the P501S gene (also referred to herein as L1-12, SEQ ID NO: 110). The P1S#10 peptide was derived by analysis of the predicted polypeptide sequence for P501S for potential HLA-A2 binding sequences as defined by published HLA-A2 binding motifs (Parker, KC, et al, J. Immunol., 152:163, 1994). P1S#10 peptide was synthesized as described in Example 4, and empirically tested for HLA-A2 binding using a T cell based competition assay. Predicted A2 binding peptides were tested for their ability to compete HLA-A2 specific peptide presentation to an HLA-A2 restricted CTL clone (D150M58), which is specific for the HLA-A2 binding influenza matrix peptide fluM58. D150M58 CTL secretes TNF in response to self-presentation of peptide fluM58. In the competition assay, test peptides at 100-200 µg/ml were added to cultures of D150M58 CTL in order to bind HLA-A2 on the CTL. After thirty minutes, CTL cultured with test peptides, or control peptides, were tested for their antigen dose response to the fluM58 peptide in a standard TNF bioassay. As shown in Figure 3, peptide P1S#10 competes HLA-A2 restricted presentation of fluM58, demonstrating that peptide P1S#10 binds HLA-A2.

Mice expressing the transgene for human HLA A2.1 were immunized as described by Theobald et al. (Proc. Natl. Acad. Sci. USA 92:11993-11997, 1995) with the following modifications. Mice were immunized with 62.5µg of P1S #10 and 120µg of an I-A^b binding peptide derived from Hepatitis B Virus protein emulsified in incomplete Freund's adjuvant. Three weeks later these mice were sacrificed and single cell suspensions prepared using a nylon mesh. Cells were then resuspended at 6 x 10^6 cells/ml in complete media (as described above) and cultured in the presence of irradiated (3000 rads) P1S#10-pulsed (2µ g/ml P1S#10 and 10mg/ml β2-microglobulin) LPS blasts (A2 transgenic spleens cells cultured in the presence of 7µg/ml dextran sulfate and 25µg/ml LPS for 3 days). Six days later cells (5 x 10^5/ml) were restimulated with 2.5 x 10^6/ml peptide-pulsed irradiated (20,000 rads) EL4A2Kb cells, as described above, and 3 x 10^6/ml A2 transgenic spleen feeder cells. Cells were cultured in the presence of 20 U/ml IL-2. Cells were restimulated on a weekly

basis in preparation for cloning. After three rounds of *in vitro* stimulations, one line was generated that recognized P1S#10-pulsed Jurkat A2Kb targets and P501S-transduced Jurkat targets as shown in Figure 4.

A P1S#10-specific CTL line was cloned by limiting dilution analysis with peptide pulsed EL4 A2Kb tumor cells (1×10^4 cells/ well) as stimulators and A2 transgenic spleen cells as feeders (5×10^5 cells/ well) grown in the presence of 30U/ml IL-2. On day 14, cells were restimulated as before. On day 21, viable clones were isolated and maintained in culture. As shown in Figure 5, five of these clones demonstrated specific cytolytic reactivity against P501S-transduced Jurkat A2Kb targets. This data indicates that P1S#10 represents a naturally processed epitope of the P501S protein that is expressed in the context of the human HLA-A2.1 molecule.

EXAMPLE 7
ABILITY OF HUMAN T CELLS TO RECOGNIZE PROSTATE TUMOR POLYPEPTIDES

This Example illustrates the ability of T cells specific for a prostate tumor polypeptide to recognize human tumor.

Human CD8$^+$ T cells were primed *in vitro* to the P2S-12 peptide (SEQ ID NO: 306) derived from P502S (also referred to as J1-17) using dendritic cells according to the protocol of Van Tsai et al. (*Critical Reviews in Immunology 18*:65-75, 1998). The resulting CD8$^+$ T cell microcultures were tested for their ability to recognize the P2S-12 peptide presented by autologous fibroblasts or fibroblasts which were transduced to express the P502S gene in a γ-interferon ELISPOT assay (*see* Lalvani et al., *J. Exp. Med. 186*:859-865, 1997). Briefly, titrating numbers of T cells were assayed in duplicate on 10^4 fibroblasts in the presence of 3 µg/ml human β$_2$-microglobulin and 1 µg/ml P2S-12 peptide or control E75 peptide. In addition, T cells were simultaneously assayed on autologous fibroblasts transduced with the P502S gene or as a control, fibroblasts transduced with HER-2/*neu*. Prior to the assay, the fibroblasts were treated with 10 ng/ml γ-interferon for 48 hours to upregulate class I MHC expression. One of the microcultures (#5) demonstrated strong recognition of both peptide pulsed fibroblasts as well as transduced fibroblasts in a γ-interferon ELISPOT assay. Figure 2A demonstrates that there was a strong increase in the number of γ-interferon spots with increasing numbers of T cells on fibroblasts pulsed with the P2S-12 peptide (solid bars) but not with the control E75 peptide (open bars). This shows the ability of these T cells to specifically recognize the P2S-12 peptide. As shown in Figure 2B, this microculture also demonstrated an increase in the number of γ-interferon spots with increasing numbers of T

cells on fibroblasts transduced to express the P502S gene but not the HER-2/*neu* gene. These results provide additional confirmatory evidence that the P2S-12 peptide is a naturally processed epitope of the P502S protein. Furthermore, this also demonstrates that there exists in the human T cell repertoire, high affinity T cells which are capable of recognizing this epitope. These T cells should also be capable of recognizing human tumors which express the P502S gene.

EXAMPLE 8
PRIMING OF CTL *IN VIVO* USING NAKED DNA IMMUNIZATION WITH A PROSTATE ANTIGEN

The prostate tumor antigen L1-12, as described above, is also referred to as P501S. HLA A2Kb Tg mice (provided by Dr L. Sherman, The Scripps Research Institute, La Jolla, CA) were immunized with 100 µg VR10132-P501S either intramuscularly or intradermally. The mice were immunized three times, with a two week interval between immunizations. Two weeks after the last immunization, immune spleen cells were cultured with Jurkat A2Kb-P501S transduced stimulator cells. CTL lines were stimulated weekly. After two weeks of *in vitro* stimulation, CTL activity was assessed against P501S transduced targets. Two out of 8 mice developed strong anti-P501S CTL responses. These results demonstrate that P501S contains at least one naturally processed A2-restricted CTL epitope.

EXAMPLE 9
GENERATION OF HUMAN CTL *IN VITRO* USING WHOLE GENE PRIMING AND STIMULATION TECHNIQUES WITH PROSTATE TUMOR ANTIGEN

Using *in vitro* whole-gene priming with P501S-retrovirally transduced autologous fibroblasts (see, for example, Yee et al, *The Journal of Immunology*, 157(9):4079-86, 1996), human CTL lines were derived that specifically recognize autologous fibroblasts transduced with P501S (also known as L1-12), as determined by interferon-γ ELISPOT analysis as described above. Using a panel of HLA-mismatched fibroblast lines transduced with P501S, these CTL lines were shown to be restricted HLA-A2 class I allele. Specifically, dendritic cells (DC) were differentiated from monocyte cultures derived from PBMC of normal human donors by growing for five days in RPMI medium containing 10% human serum, 50 ng/ml human GM-CSF and 30 ng/ml human IL-4. Following culture, DC were infected overnight with recombinant P501S vaccinia virus at a multiplicity of infection (M.O.I) of five, and matured overnight by the addition of 3 µg/ml CD40 ligand. Virus was inactivated by UV irradiation. CD8+ T cells were isolated using a magnetic bead system, and

priming cultures were initiated using standard culture techniques. Cultures were restimulated every 7-10 days using autologous primary fibroblasts retrovirally transduced with P501S. Following four stimulation cycles, CD8+ T cell lines were identified that specifically produced interferon-γ when stimulated with P501S-transduced autologous fibroblasts. The P501S-specific activity could be sustained by the continued stimulation of the cultures with P501S-transduced fibroblasts in the presence of IL-15. A panel of HLA-mismatched fibroblast lines transduced with P501S were generated to define the restriction allele of the response. By measuring interferon-γ in an ELISPOT assay, the P501S specific response was shown to be restricted by HLA-A2. These results demonstrate that a CD8+ CTL response to P501S can be elicited.

EXAMPLE 10

IDENTIFICATION OF A NATURALLY PROCESSED CTL EPITOPE CONTAINED WITHIN A PROSTATE TUMOR ANTIGEN

The 9-mer peptide p5 (SEQ ID NO: 338) was derived from the P703P antigen (also referred to as P20). The p5 peptide is immunogenic in human HLA-A2 donors and is a naturally processed epitope. Antigen specific CD8+ T cells can be primed following repeated in vitro stimulations with monocytes pulsed with p5 peptide. These CTL specifically recognize p5-pulsed target cells in both ELISPOT (as described above) and chromium release assays. Additionally, immunization of HLA-A2 transgenic mice with p5 leads to the generation of CTL lines which recognize a variety of P703P transduced target cells expressing either HLA-A2Kb or HLA-A2. Specifically, HLA-A2 transgenic mice were immunized subcutaneously in the footpad with 100 μg of p5 peptide together with 140 μg of hepatitis B virus core peptide (a Th peptide) in Freund's incomplete adjuvant. Three weeks post immunization, spleen cells from immunized mice were stimulated in vitro with peptide-pulsed LPS blasts. CTL activity was assessed by chromium release assay five days after primary in vitro stimulation. Retrovirally transduced cells expressing the control antigen P703P and HLA-A2Kb were used as targets. CTL lines that specifically recognized both p5-pulsed targets as well as P703P-expressing targets were identified.

Human in vitro priming experiments demonstrated that the p5 peptide is immunogenic in humans. Dendritic cells (DC) were differentiated from monocyte cultures derived from PBMC of normal human donors by culturing for five days in RPMI medium containing 10% human serum, 50 ng/ml human GM-CSF and 30 ng/ml human IL-4. Following culture, the DC were pulsed with p5 peptide and cultured with GM-CSF and IL-4 together with CD8+ T cell enriched PBMC. CTL lines were restimulated on a weekly basis

with p5-pulsed monocytes. Five to six weeks after initiation of the CTL cultures, CTL recognition of p5-pulsed target cells was demonstrated.

EXAMPLE 11
EXPRESSION OF A BREAST TUMOR-DERIVED ANTIGEN
IN PROSTATE

Isolation of the antigen B305D from breast tumor by differential display is described in US Patent Application No. 08/700,014, filed August 20, 1996. Several different splice forms of this antigen were isolated. The determined cDNA sequences for these splice forms are provided in SEQ ID NO: 366-375, with the predicted amino acid sequences corresponding to the sequences of SEQ ID NO: 292, 298 and 301-303 being provided in SEQ ID NO: 299-306, respectively.

The expression levels of B305D in a variety of tumor and normal tissues were examined by real time PCR and by Northern analysis. The results indicated that B305D is highly expressed in breast tumor, prostate tumor, normal prostate tumor and normal testes, with expression being low or undetectable in all other tissues examined (colon tumor, lung tumor, ovary tumor, and normal bone marrow, colon, kidney, liver, lung, ovary, skin, small intestine, stomach).

EXAMPLE 12
ELICITATION OF PROSTATE TUMOR ANTIGEN-SPECIFIC CTL RESPONSES IN
HUMAN BLOOD

This Example illustrates the ability of a prostate tumor antigen to elicit a CTL response in blood of normal humans.

Autologous dendritic cells (DC) were differentiated from monocyte cultures derived from PBMC of normal donors by growth for five days in RPMI medium containing 10% human serum, 50 ng/ml GMCSF and 30 ng/ml IL-4. Following culture, DC were infected overnight with recombinant P501S-expressing vaccinia virus at an M.O.I. of 5 and matured for 8 hours by the addition of 2 micrograms/ml CD40 ligand. Virus was inactivated by UV irradiation, CD8^{+} cells were isolated by positive selection using magnetic beads, and priming cultures were initiated in 24-well plates. Following five stimulation cycles, CD8+ lines were identified that specifically produced interferon-gamma when stimulated with autologous P501S-transduced fibroblasts. The P501S-specific activity of cell line 3A-1 could be maintained following additional stimulation cycles on autologous B-LCL transduced with P501S. Line 3A-1 was shown to specifically recognize autologous B-LCL transduced to

express P501S, but not EGFP-transduced autologous B-LCL, as measured by cytotoxity assays (^{51}Cr release) and interferon-gamma production (Interferon-gamma Elispot; *see* above and Lalvani et al., *J. Exp. Med. 186*:859-865, 1997). The results of these assays are presented in Figures 6A and 6B.

EXAMPLE 13
IDENTIFICATION OF PROSTATE TUMOR ANTIGENS BY MICROARRAY ANALYSIS

This Example describes the isolation of certain prostate tumor polypeptides from a prostate tumor cDNA library.

A human prostate tumor cDNA expression library as described above was screened using microarray analysis to identify clones that display at least a three fold over-expression in prostate tumor and/or normal prostate tissue, as compared to non-prostate normal tissues (not including testis). 372 clones were identified, and 319 were successfully sequenced. Table 1 presents a summary of these clones, which are shown in SEQ ID NOs:385-400. Of these sequences SEQ ID NOs:386, 389, 390 and 392 correspond to novel genes, and SEQ ID NOs: 393 and 396 correspond to previously identified sequences. The others (SEQ ID NOs:385, 387, 388, 391, 394, 395 and 397-400) correspond to known sequences, as shown in Table I.

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Table I

Summary of Prostate Tumor Antigens

Known Genes	Previously identified Genes	Novel Genes
T-cell gamma chain	P504S	23379 (SEQ ID NO:389)
Kallikrein	P1000C	23399 (SEQ ID NO:392)
Vector	P501S	23320 (SEQ ID NO:386)
CGI-82 protein mRNA (23319; SEQ ID NO:385)	P503S	23381 (SEQ ID NO:390)
PSA	P510S	
Ald. 6 Dehyd.	P784P	
L-iditol-2 dehydrogenase (23376; SEQ ID NO:388)	P502S	
Ets transcription factor PDEF (22672; SEQ ID NO:398)	P706P	
hTGR (22678; SEQ ID NO:399)	19142.2, bangur.seq (22621; SEQ ID NO:396)	
KIAA0295(22685; SEQ ID NO:400)	5566.1 Wang(23404; SEQ ID NO:393)	
Prostatic Acid Phosphatase(22655; SEQ ID NO:397)	P712P	

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transglutaminase (22611; SEQ ID NO:395)	P778P		
HDLBP (23508; SEQ ID NO:394)			
CGI-69 Protein(23367; SEQ ID NO:387)			
KIAA0122(23383; SEQ ID NO:391)			
TEEG			

CGI-82 showed 4.06 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 43% of prostate tumors, 25% normal prostate, not detected in other normal tissues tested. L-iditol-2 dehydrogenase showed 4.94 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 90% of prostate tumors, 100% of normal prostate, and not detected in other normal tissues tested. Ets transcription factor PDEF showed 5.55 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 47% prostate tumors, 25% normal prostate and not detected in other normal tissues tested. hTGR1 showed 9.11 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 63% of prostate tumors and is not detected in normal tissues tested including normal prostate. KIAA0295 showed 5.59 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 47% of prostate tumors, low to undetectable in normal tissues tested including normal prostate tissues. Prostatic acid phosphatase showed 9.14 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 67% of prostate tumors, 50% of normal prostate, and not detected in other normal tissues tested. Transglutaminase showed 14.84 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 30% of prostate tumors, 50% of normal prostate, and is not detected in other normal tissues tested. High density lipoprotein binding protein (HDLBP) showed 28.06 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 97% of prostate tumors, 75% of normal prostate, and is undetectable in all other normal tissues tested. CGI-69 showed 3.56 fold over-expression in prostate tissues as compared to other normal tissues tested. It is a low abundant gene, detected in more than 90% of prostate tumors, and in 75% normal prostate tissues. The expression of this gene in normal tissues was very low. KIAA0122 showed 4.24 fold over-expression in prostate

tissues as compared to other normal tissues tested. It was over-expressed in 57% of prostate tumors, it was undetectable in all normal tissues tested including normal prostate tissues. 19142.2 bangur showed 23.25 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 97% of prostate tumors and 100% of normal prostate. It was undetectable in other normal tissues tested. 5566.1 Wang showed 3.31 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 97% of prostate tumors, 75% normal prostate and was also over-expressed in normal bone marrow, pancreas, and activated PBMC. Novel clone 23379 showed 4.86 fold over-expression in prostate tissues as compared to other normal tissues tested. It was detectable in 97% of prostate tumors and 75% normal prostate and is undetectable in all other normal tissues tested. Novel clone 23399 showed 4.09 fold over-expression in prostate tissues as compared to other normal tissues tested. It was over-expressed in 27% of prostate tumors and was undetectable in all normal tissues tested including normal prostate tissues. Novel clone 23320 showed 3.15 fold over-expression in prostate tissues as compared to other normal tissues tested. It was detectable in all prostate tumors and 50% of normal prostate tissues. It was also expressed in normal colon and trachea. Other normal tissues do not express this gene at high level.

EXAMPLE 14

IDENTIFICATION OF PROSTATE TUMOR ANTIGENS BY ELECTRONIC SUBTRACTION

This Example describes the use of an electronic subtraction technique to identify prostate tumor antigens.

Potential prostate-specific genes present in the GenBank human EST database were identified by electronic subtraction (similar to that described by Vasmatizis et al., *Proc. Natl. Acad. Sci. USA* 95:300-304, 1998). The sequences of EST clones (43,482) derived from various prostate libraries were obtained from the GenBank public human EST database. Each prostate EST sequence was used as a query sequence in a BLASTN (National Center for Biotechnology Information) search against the human EST database. All matches considered identical (length of matching sequence >100 base pairs, density of identical matches over this region > 70%) were grouped (aligned) together in a cluster. Clusters containing more than 200 ESTs were discarded since they probably represented repetitive elements or highly expressed genes such as those for ribosomal proteins. If two or more clusters shared common ESTs, those clusters were grouped together into a "supercluster," resulting in 4,345 prostate superclusters.

Records for the 479 human cDNA libraries represented in the GenBank release were downloaded to create a database of these cDNA library records. These 479 cDNA libraries were grouped into three groups, Plus (normal prostate and prostate tumor libraries, and breast cell lines, in which expression was desired), Minus (libraries from other normal adult tissues, in which expression was not desirable), and Other (fetal tissue, infant tissue, tissues found only in women, non-prostate tumors and cell lines other than prostate cell lines, in which expression was considered to be irrelevant). A summary of these library groups is presented in Table II.

Table II
Prostate cDNA Libraries and ESTs

Library	# of Libraries	# of ESTs
Plus	25	43,482
Normal	11	18,875
Tumor	11	21,769
Cell lines	3	2,838
Minus	166	
Other	287	

Each supercluster was analyzed in terms of the ESTs within the supercluster. The tissue source of each EST clone was noted and used to classify the superclusters into four groups: Type 1- EST clones found in the Plus group libraries only; no expression detected in Minus or Other group libraries; Type 2- EST clones found in the Plus and Other group libraries only; no expression detected in the Minus group; Type 3- EST clones found in the Plus, Minus and Other group libraries, but the expression in the Plus group is higher than in either the Minus or Other groups; and Type 4- EST clones found in Plus, Minus and Other group libraries, but the expression in the Plus group is higher than the expression in the Minus group. This analysis identified 4,345 breast clusters (see Table III). From these clusters, 3,172 EST clones were ordered from Research Genetics, Inc., and were received as frozen glycerol stocks in 96-well plates.

Table III
Prostate Cluster Summary

Type	# of Superclusters	# of ESTs Ordered
1	688	677
2	2899	2484
3	85	11
4	673	0
Total	4345	3172

The inserts were PCR-amplified using amino-linked PCR primers for Synteni microarray analysis. When more than one PCR product was obtained for a particular clone, that PCR product was not used for expression analysis. In total, 2,528 clones from the electronic subtraction method were analyzed by microarray analysis to identify electronic subtraction breast clones that had high tumor vs. normal tissue mRNA. Such screens were performed using a Synteni (Palo Alto, CA) microarray, according to the manufacturer's instructions (and essentially as described by Schena et al., *Proc. Natl. Acad. Sci. USA* 93:10614-10619, 1996 and Heller et al., *Proc. Natl. Acad. Sci. USA* 94:2150-2155, 1997). Within these analyses, the clones were arrayed on the chip, which was then probed with fluorescent probes generated from normal and tumor prostate cDNA, as well as various other normal tissues. The slides were scanned and the fluorescence intensity was measured.

Clones with an expression ratio greater than 3 (i.e., the level in prostate tumor cDNA was at least three times the level in normal prostate cDNA) were identified as prostate tumor-specific sequences (Table IV). The sequences of these clones are provided in SEQ ID NOs:401-453, with certain novel sequences shown in SEQ ID NOs:407, 413, 416-419, 422, 426, 427 and 450.

Table IV
Prostate-tumor Specific Clones

SEQ ID NO.	Sequence Designation	Comments
401	22545	previously identified P1-000C
402	22547	previously identified P704P

403	22548	known
404	22550	known
405	22551	PSA
406	22552	prostate secretory protein 94
407	22553	novel
408	22558	previously identified P509S
409	22562	glandular kallikrein
410	22565	previously identified P1000C
411	22567	PAP
412	22568	B1006C (breast tumor antigen)
413	22570	novel
414	22571	PSA
415	22572	previously identified P706P
416	22573	novel
417	22574	novel
418	22575	novel
419	22580	novel
420	22581	PAP
421	22582	prostatic secretory protein 94
422	22583	novel
423	22584	prostatic secretory protein 94
424	22585	prostatic secretory protein 94
425	22586	known
426	22587	novel
427	22588	novel
428	22589	PAP
429	22590	known
430	22591	PSA
431	22592	known
432	22593	Previously identified P777P
433	22594	T cell receptor gamma chain
434	22595	Previously identified P705P
435	22596	Previously identified P707P
436	22847	PAP
437	22848	known
438	22849	prostatic secretory protein 57

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439	22851	PAP
440	22852	PAP
441	22853	PAP
442	22854	previously identified P509S
443	22855	previously identified P705P
444	22856	previously identified P774P
445	22857	PSA
446	23601	previously identified P777P
447	23602	PSA
448	23605	PSA
449	23606	PSA
450	23612	novel
451	23614	PSA
452	23618	previously identified P1000C
453	23622	previously identified P705P

EXAMPLE 15

FURTHER IDENTIFICATION OF PROSTATE TUMOR ANTIGENS
BY MICROARRAY ANALYSIS

This Example describes the isolation of additional prostate tumor polypeptides from a prostate tumor cDNA library.

A human prostate tumor cDNA expression library as described above was screened using microarray analysis to identify clones that display at least a three fold over-expression in prostate tumor and/or normal prostate tissue, as compared to non-prostate normal tissues (not including testis). 142 clones were identified and sequenced. Certain of these clones are shown in SEQ ID NOs:454-467. Of these sequences SEQ ID NOs:459-461 correspond to novel genes. The others (SEQ ID NOs:454-458 and 461-467) correspond to known sequences.

EXAMPLE 16

FURTHER CHARACTERIZATION OF PROSTATE TUMOR ANTIGEN P710P

This Example describes the full length cloning of P710P.

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The prostate cDNA library described above was screened with the P710P fragment described above. One million colonies were plated on LB/Ampicillin plates. Nylon membrane filters were used to lift these colonies, and the cDNAs picked up by these filters were then denatured and cross-linked to the filters by UV light. The P710P fragment was radiolabeled and used to hybridize with the filters. Positive cDNA clones were selected and their cDNAs recovered and sequenced by an automatic ABI Sequencer. Four sequences were obtained, and are presented in SEQ ID NOs:468-471.

From the foregoing, it will be appreciated that, although specific embodiments of the invention have been described herein for the purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. Accordingly, the present invention is not limited except as by the appended claims.

CLAIMS

1.   An isolated polypeptide comprising at least an immunogenic portion of a prostate tumor protein, or a variant thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(a)   sequences recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472;

(b)   sequences that hybridize to any of the foregoing sequences under moderately stringent conditions; and

(c)   complements of any of the sequence of (a) or (b).

2.   An isolated polypeptide according to claim 1, wherein the polypeptide comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472, or a complement of any of the foregoing polynucleotide sequences.

3.   An isolated polypeptide comprising a sequence recited in any one of SEQ ID NO: 108, 112, 113, 114, 172, 176, 178, 327, 329, 331, 339 and 383.

4.   An isolated polynucleotide encoding at least 15 amino acid residues of a prostate tumor protein, or a variant thereof that differs in one or more substitutions, deletions, additions and/or insertions such that the ability of the variant to react with antigen-specific antisera is not substantially diminished, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434,

435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472, or a complement of any of the foregoing sequences.

5.   An isolated polynucleotide encoding a prostate tumor protein, or a variant thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472, or a complement of any of the foregoing sequences.

6.   An isolated polynucleotide comprising a sequence recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472.

7.   An isolated polynucleotide comprising a sequence that hybridizes, under moderately stringent conditions, to a sequence recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472.

8.   An isolated polynucleotide complementary to a polynucleotide according to any one of claims 4-7.

9.   An expression vector comprising a polynucleotide according to any one of claims 4-7.

10.   A host cell transformed or transfected with an expression vector according to claim 9.

11.   An expression vector comprising a polynucleotide according claim 8.

12. A host cell transformed or transfected with an expression vector according to claim 11.

13. A pharmaceutical composition comprising a polypeptide according to claim 1, in combination with a physiologically acceptable carrier.

14. A vaccine comprising a polypeptide according to claim 1, in combination with a non-specific immune response enhancer.

15. A vaccine according to claim 14, wherein the non-specific immune response enhancer is an adjuvant.

16. A vaccine according to claim 14, wherein the non-specific immune response enhancer induces a predominantly Type I response.

17. A pharmaceutical composition comprising a polynucleotide according to claim 4, in combination with a physiologically acceptable carrier.

18. A vaccine comprising a polynucleotide according to claim 4, in combination with a non-specific immune response enhancer.

19. A vaccine according to claim 18, wherein the non-specific immune response enhancer is an adjuvant.

20. A vaccine according to claim 18, wherein the non-specific immune response enhancer induces a predominantly Type I response.

21. An isolated antibody, or antigen-binding fragment thereof, that specifically binds to a prostate tumor protein that comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472 or a complement of any of the foregoing polynucleotide sequences.

22.   A pharmaceutical composition comprising an antibody or fragment thereof according to claim 18, in combination with a physiologically acceptable carrier.

23.   A pharmaceutical composition comprising an antigen-presenting cell that expresses a polypeptide according to claim 1, in combination with a pharmaceutically acceptable carrier or excipient.

24.   A pharmaceutical composition according to claim 23, wherein the antigen presenting cell is a dendritic cell or a macrophage.

25.   A vaccine comprising an antigen-presenting cell that expresses a polypeptide according to claim 1, in combination with a non-specific immune response enhancer.

26.   A vaccine according to claim 25, wherein the non-specific immune response enhancer is an adjuvant.

27.   A vaccine according to claim 25, wherein the non-specific immune response enhancer induces a predominantly Type 1 response.

28.   A vaccine according to claim 25, wherein the antigen-presenting cell is a dendritic cell.

29.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a polypeptide according to claim 1, and thereby inhibiting the development of a cancer in the patient.

30.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a polynucleotide according to claim 4, and thereby inhibiting the development of a cancer in the patient.

31.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of an antibody or antigen-binding fragment thereof according to claim 21, and thereby inhibiting the development of a cancer in the patient.

32. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of an antigen-presenting cell that expresses a polypeptide according to claim 1, and thereby inhibiting the development of a cancer in the patient.

33. A method according to claim 32, wherein the antigen-presenting cell is a dendritic cell.

34. A method according to any one of claims 29-32, wherein the cancer is prostate cancer.

35. A fusion protein comprising at least one polypeptide according to claim 1.

36. A fusion protein according to claim 35, wherein the fusion protein comprises an expression enhancer that increases expression of the fusion protein in a host cell transfected with a polynucleotide encoding the fusion protein.

37. A fusion protein according to claim 35, wherein the fusion protein comprises a T helper epitope that is not present within the polypeptide of claim 1.

38. A fusion protein according to claim 35, wherein the fusion protein comprises an affinity tag.

39. An isolated polynucleotide encoding a fusion protein according to claim 35.

40. A pharmaceutical composition comprising a fusion protein according to claim 32, in combination with a physiologically acceptable carrier.

41. A vaccine comprising a fusion protein according to claim 35, in combination with a non-specific immune response enhancer.

42. A vaccine according to claim 41, wherein the non-specific immune response enhancer is an adjuvant.

43.   A vaccine according to claim 41, wherein the non-specific immune response enhancer induces a predominantly Type I response.

44.   A pharmaceutical composition comprising a polynucleotide according to claim 40, in combination with a physiologically acceptable carrier.

45.   A vaccine comprising a polynucleotide according to claim 40, in combination with a non-specific immune response enhancer.

46.   A vaccine according to claim 45, wherein the non-specific immune response enhancer is an adjuvant.

47.   A vaccine according to claim 45, wherein the non-specific immune response enhancer induces a predominantly Type I response.

48.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a pharmaceutical composition according to claim 40 or claim 44.

49.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a vaccine according to claim 41 or claim 45.

50.   A method for removing tumor cells from a biological sample, comprising contacting a biological sample with T cells that specifically react with a prostate tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(i)   polynucleotides recited in any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472; and

(ii)   complements of the foregoing polynucleotides;

wherein the step of contacting is performed under conditions and for a time sufficient to permit the removal of cells expressing the prostate tumor protein from the sample.

51.   A method according to claim 50, wherein the biological sample is blood or a fraction thereof.

52.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient a biological sample treated according to the method of claim 50.

53.   A method for stimulating and/or expanding T cells specific for a prostate tumor protein, comprising contacting T cells with one or more of:

(i)   a polypeptide according to claim 1;

(ii)   a polypeptide encoded by a polynucleotide comprising a sequence provided in any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472;

(iii)   a polynucleotide encoding a polypeptide of (i) or (ii); and/or

(iv)   an antigen presenting cell that expresses a polypeptide of (i) or (ii);

under conditions and for a time sufficient to permit the stimulation and/or expansion of T cells.

54.   An isolated T cell population, comprising T cells prepared according to the method of claim 53.

55.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a T cell population according to claim 54.

56.   A method for inhibiting the development of a cancer in a patient, comprising the steps of:

(a)   incubating CD4$^+$ and/or CD8+ T cells isolated from a patient with at least one component selected from the group consisting of:

(i)   a polypeptide according to claim 1;

(ii)   a polypeptide encoded by a polynucleotide comprising a sequence of any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472;

(iii)   a polynucleotide encoding a polypeptide of (i) or (ii); or

(iv)   an antigen-presenting-cell that expresses a polypeptide of (i) or (ii);

such that T cells proliferate; and

(b)   administering to the patient an effective amount of the proliferated T cells, and thereby inhibiting the development of a cancer in the patient.

57.   A method for inhibiting the development of a cancer in a patient, comprising the steps of:

(a)   incubating CD4$^+$ and/or CD8+ T cells isolated from a patient with at least one component selected from the group consisting of:

(i)   a polypeptide according to claim 1;

(ii)   a polypeptide encoded by a polynucleotide comprising a sequence of any one of SEQ ID NOs: 1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472;

(iii)   a polynucleotide encoding a polypeptide of (i) or (ii); or

(iv)   an antigen-presenting cell that expresses a polypeptide of (i) or (ii);

such that T cells proliferate;

(b)   cloning at least one proliferated cell; and

(c)   administering to the patient an effective amount of the cloned T cells, and thereby inhibiting the development of a cancer in the patient.

58.   A method for determining the presence or absence of a cancer in a patient, comprising the steps of:

(a)   contacting a biological sample obtained from a patient with a binding agent that binds to a prostate tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(i)   polynucleotides recited in any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472; and

(ii)   complements of the foregoing polynucleotides;

(b)   detecting in the sample an amount of polypeptide that binds to the binding agent; and

(c)   comparing the amount of polypeptide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

59.   A method according to claim 58, wherein the binding agent is an antibody.

60.   A method according to claim 59, wherein the antibody is a monoclonal antibody.

61.   A method according to claim 58, wherein the cancer is prostate cancer.

62.   A method for monitoring the progression of a cancer in a patient, comprising the steps of:

(a)   contacting a biological sample obtained from a patient at a first point in time with a binding agent that binds to a prostate tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472, or a complement of any of the foregoing polynucleotides;

(b)   detecting in the sample an amount of polypeptide that binds to the binding agent;

(c)   repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and

(d)   comparing the amount of polypeptide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

63.   A method according to claim 62, wherein the binding agent is an antibody.

64.   A method according to claim 63, wherein the antibody is a monoclonal antibody.

65.   A method according to claim 62, wherein the cancer is a prostate cancer.

66.   A method for determining the presence or absence of a cancer in a patient, comprising the steps of:

(a)   contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a prostate tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472, or a complement of any of the foregoing polynucleotides;

(b)   detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide; and

(c)   comparing the amount of polynucleotide that hybridizes to the oligonucleotide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

67.   A method according to claim 66, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

68.   A method according to claim 66, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

69.   A method for monitoring the progression of a cancer in a patient, comprising the steps of:
(a)   contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a prostate tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs:1-111, 115-171, 173-175, 177, 179-305, 307-315, 326, 328, 330, 332-335, 340-375, 381, 382 or 384-472, or a complement of any of the foregoing polynucleotides;
(b)   detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide;
(c)   repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and
(d)   comparing the amount of polynucleotide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

70.   A method according to claim 69, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

71.   A method according to claim 69, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

72.   A diagnostic kit, comprising:
(a)   one or more antibodies according to claim 21; and
(b)   a detection reagent comprising a reporter group.

73. A kit according to claim 72, wherein the antibodies are immobilized on a solid support.

74. A kit according to claim 73, wherein the solid support comprises nitrocellulose, latex or a plastic material.

75. A kit according to claim 72, wherein the detection reagent comprises an anti-immunoglobulin, protein G, protein A or lectin.

76. A kit according to claim 72, wherein the reporter group is selected from the group consisting of radioisotopes, fluorescent groups, luminescent groups, enzymes, biotin and dye particles.

77. An oligonucleotide comprising 10 to 40 nucleotides that hybridize under moderately stringent conditions to a polynucleotide that encodes a prostate tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472, or a complement of any of the foregoing polynucleotides.

78. A oligonucleotide according to claim 77, wherein the oligonucleotide comprises 10-40 nucleotides recited in any one of SEQ ID NOs:2, 3, 8-29, 41-45, 47-52, 54-65, 70, 73-74, 79, 81, 87, 90, 92, 93, 97, 103, 104, 107, 109-111, 115-160, 171, 173-175, 177, 181, 188, 191, 193, 194, 198, 203, 204, 207, 209, 220, 222-225, 227-305, 307-315, 326, 328, 330, 332, 334, 350-365, 381, 382, 384, 386, 389, 390, 392, 393, 396, 401, 402, 407, 408, 410, 413, 415-419, 422, 426, 427, 432, 434, 435, 442-444, 446, 450, 452, 453, 459-461, 468-471 or 472.

79. A diagnostic kit, comprising:
(a) an oligonucleotide according to claim 77; and
(b) a diagnostic reagent for use in a polymerase chain reaction or hybridization assay.
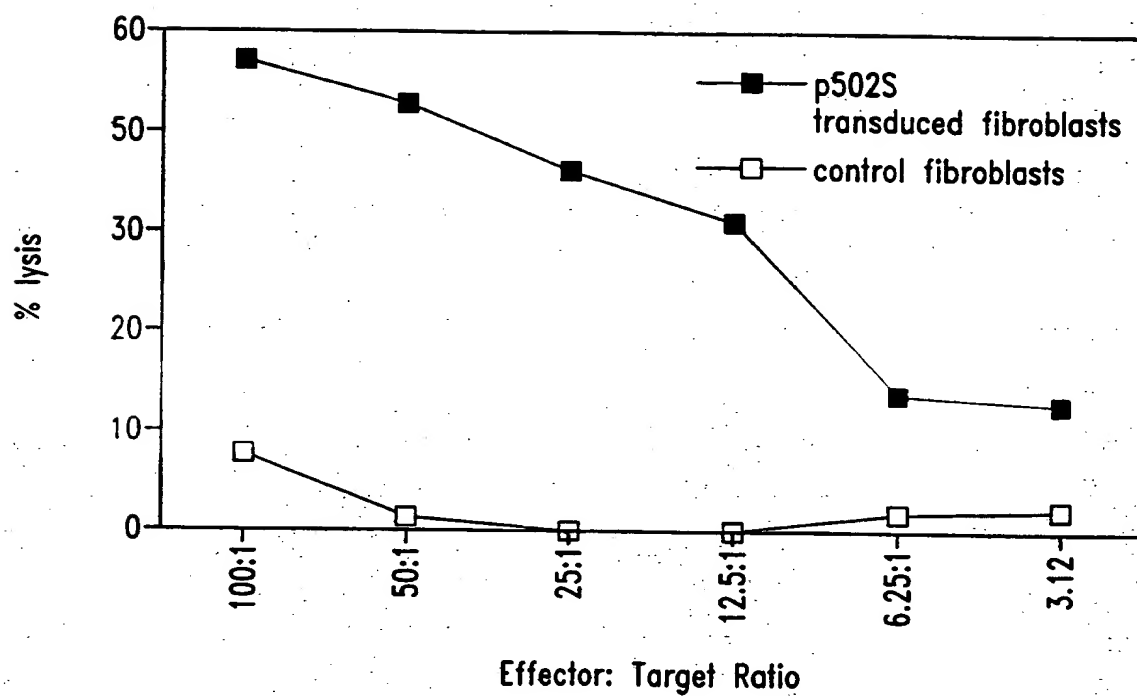
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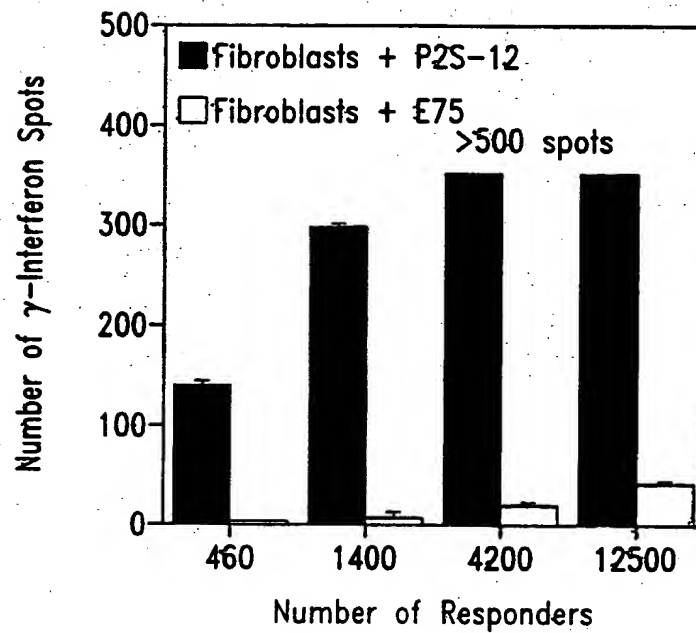
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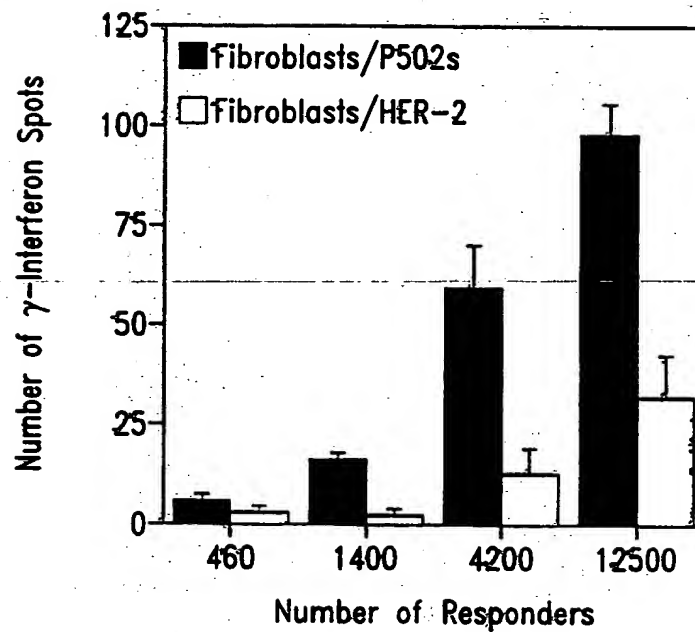
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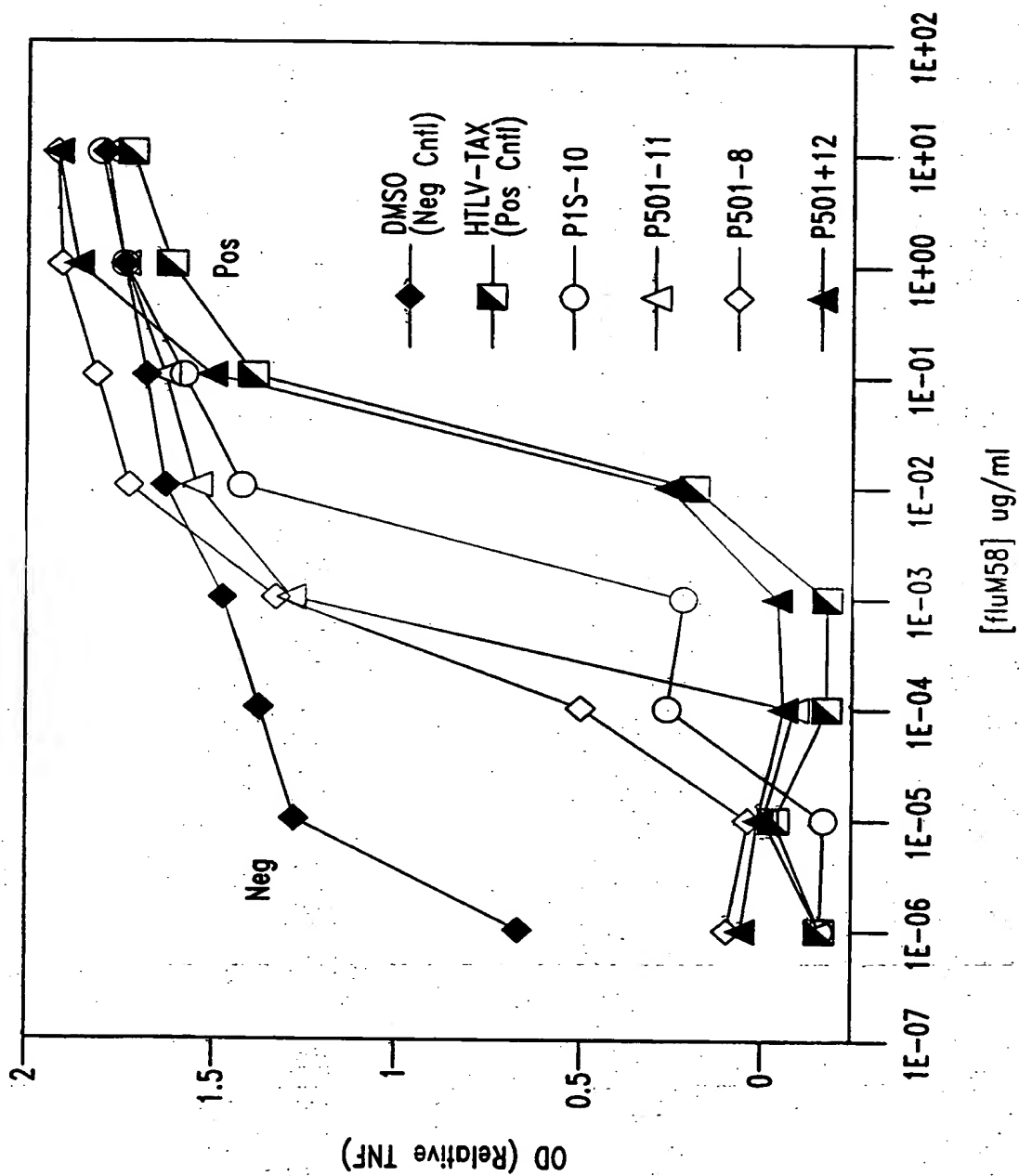
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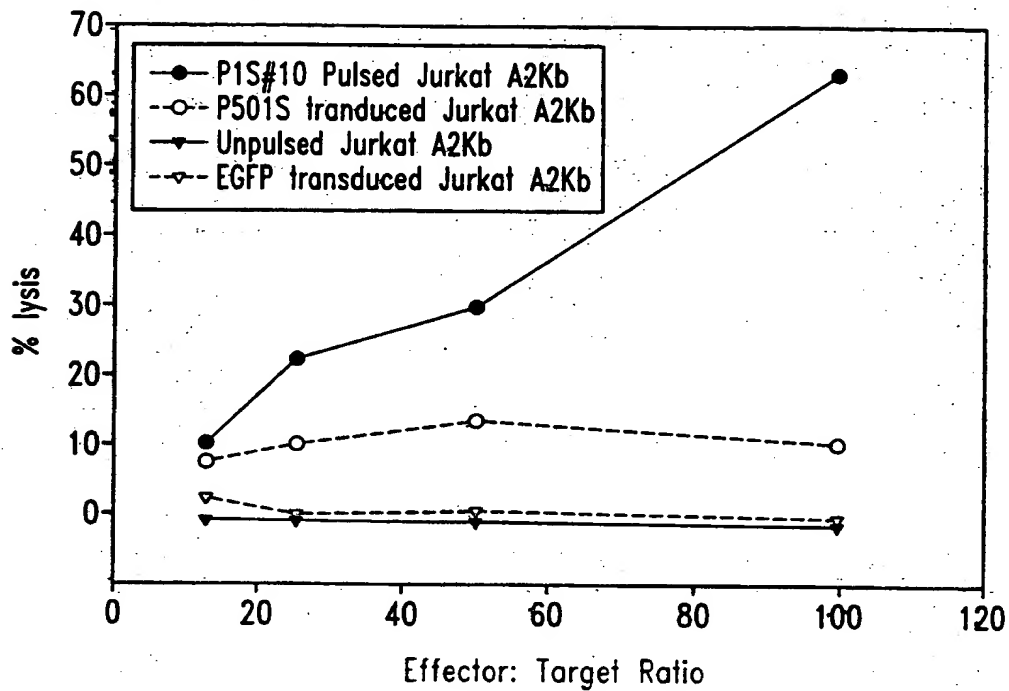
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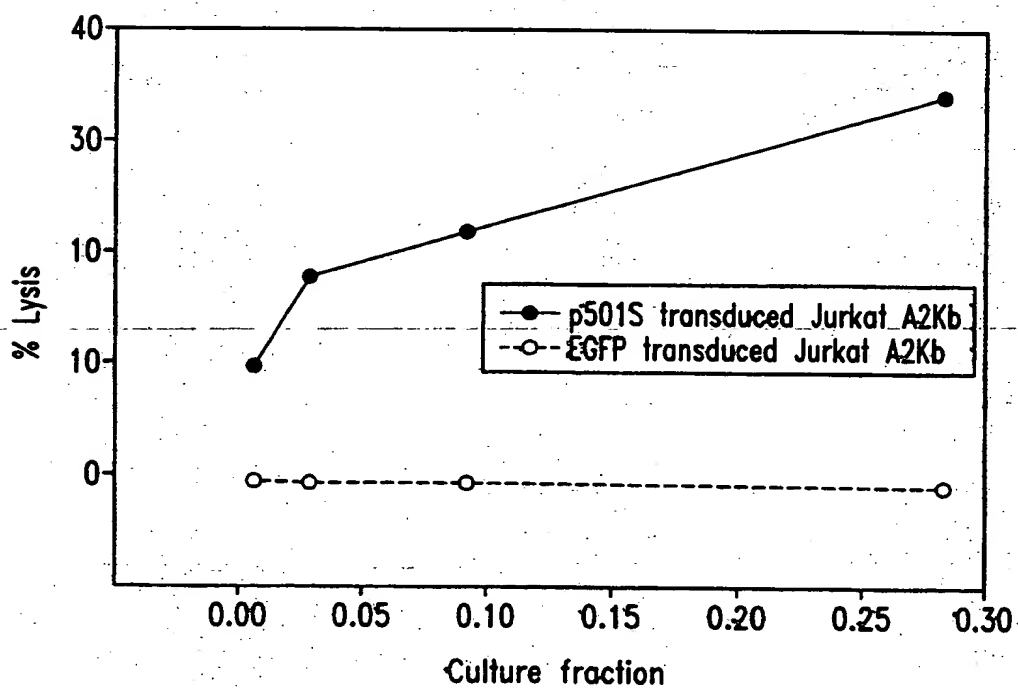
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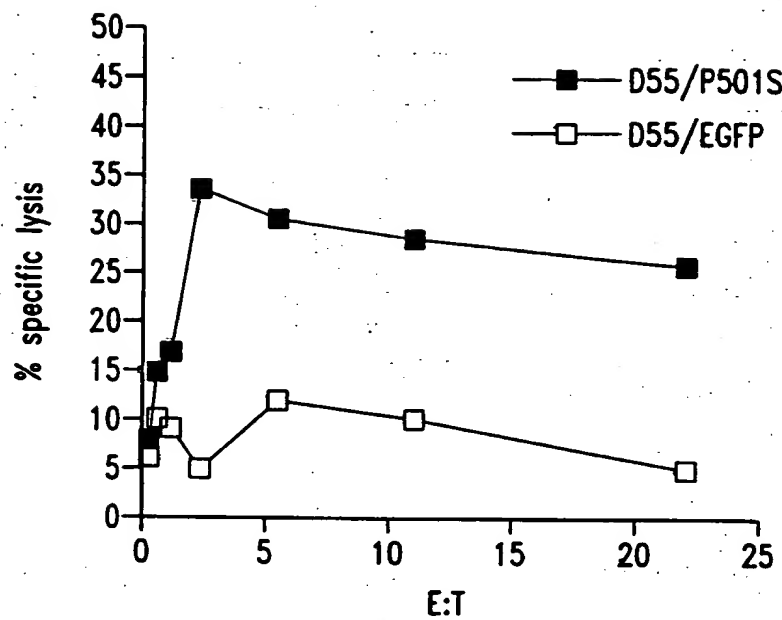
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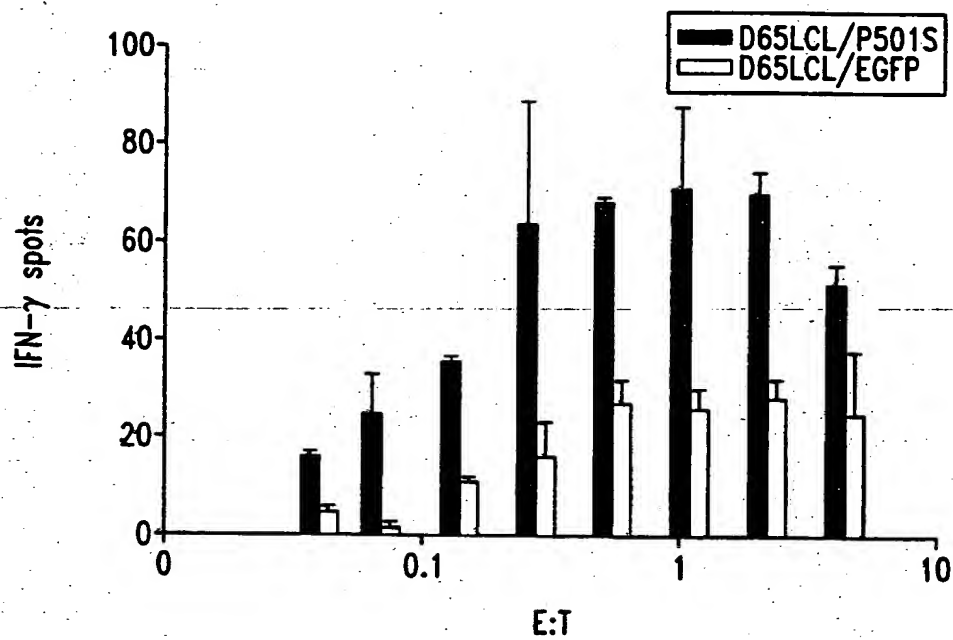
Fig. 7

SEQUENCE LISTING

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        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(828)
        <223> n = A,T,C or G

        <400> 4

```
cctcctgagt cctactgacc tgtgctttct ggtgtggagt ccagggctgc taggaaaagg       60
aatgggcaga cacaggtgta tgccaatgtt tctgaaatgg gtataatttc gtcctctcct      120
tcggaacact ggctgtctct gaagacttct cgctcagttt cagtgaggac acacacaaag      180
acgtgggtga ccatgttgtt tgtggggtgc agagatggga ggggtggggc ccaccctgga      240
agagtggaca gtgacacaag gtggacactc tctacagatc actgaggata agctggagcc      300
acaatgcatg aggcacacac acagcaagga tgacnctgta aacatagccc acgctgtcct      360
```

```
gngggcactg ggaagcctan atnaggccgt gagcanaaag aaggggagga tccactagtt       420
ctanagcggc cgccaccgcg gtgganctcc ancttttgtt cccctttagtg agggttaatt      480
gcgcgcttgg cntaatcatg gt catanctn tttcctgtgt gaaattgtta tccgctcaca      540
attccacaca acatacganc cggaaacata aantgtaaac ctggggtgcc taatgantga       600
ctaactcaca ttaattgcgt tgcgctcact gcccgctttc caatcnggaa acctgtcttg       660
ccncttgcat tnatgaatcn gccaacccec ggggaaaagc gtttgcgttt tgggcgctct       720
tccgcttcct cnctcantta ntccctncnc tcggtcattc cggctgcngc aaaccggttc       780
accncctcca aagggggtat tccggtttcc ccnaatccgg gganancc                    828
```

        <210> 5
        <211> 834
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(834)
        <223> n = A,T,C or G

        <400> 5
```
tttttttttt tttttactga tagatggaat ttattaagct tttcacatgt gatagcacat       60
agttttaatt gcatccaaag tactaacaaa aactctagca atcaagaatg gcagcatgtt      120
attttataac aatcaacacc tgtggctttt aaaatttggt tttcataaga taatttatac      180
tgaagtaaat ctagccatgc ttttaaaaaa tgctttaggt cactccaagc ttggcagtta      240
acatttggca taaacaataa taaaacaatc acaatttaat aaataacaaa tacaacattg      300
taggccataa tcatatacag tataaggaaa aggtggtagt gttgagtaag cagttattag      360
aatagaatac cttggcctct atgcaaatat gtctagacac tttgattcac tcagccctga      420
cattcagttt tcaaagtagg agacaggttc tacagtatca ttttacagtt tccaacacat      480
tgaaaacaag tagaaaatga tgagttgatt tttattaatg cattacatcc tcaagagtta      540
tcaccaaccc ctcagttata aaaaattttc aagttatatt agtcatataa cttggtgtgc      600
ttattttaaa ttagtgctaa atggattaag tgaagacaac aatggtcccc taatgtgatt      660
gatattggtc atttttaoca gcttctaaat ctnaactttc aggctttga actggaacat       720
tgnatnacag tgttccanag ttncaaccta ctggaacatt acagtgtgct tgattcaaaa      780
tgttattttg ttaaaaatta aattttaacc tggtggaaaa ataatttgaa atna            834
```

        <210> 6
        <211> 818
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(818)
        <223> n = A,T,C or G

        <400> 6
```
tttttttttt tttttttttt aagaccctca tcaatagatg gagacataca gaaatagtca       60
aaccacatct acaaaatgcc agtatcaggc ggcggcttcg aagccaaagt gatgtttgga      120
tgtaaagtga aatattagtt ggcggatgaa gcagatagtg aggaaagttg agccaataat      180
gacgtgaagt ccgtggaagc ctgtggctac aaaaaatgtt gagccgtaga tgccgtcgga      240
aatggtgaag ggagactcga agtactctga ggcttgtagg agggtaaaat agagacccag      300
taaaattgta ataagcagtg cttgaattat ttggtttcgg ttgttttcta ttagactatg      360
gtgagctcag gtgattgata ctcctgatgc gagtaatacg gatgtgttta ggagtgggac      420
ttctagggga tttagcgggg tgatgcctgt tgggggcag tgccctccta gttgggggt        480
aggggctagg ctggagtggt aaaaggctca gaaaaatcct gcgaagaaaa aaacttctga      540
```

```
ggtaataaat aggattatcc cgtatcgaag gccttttttgg acaggtggtg tgtggtggcc    600
ttggtatgtg ctttctcgtg ttacatcgcg ccatcattgg tatatggtta gtgtgttggg    660
ttantanggc ctantatgaa gaactttttgg antggaatta aatcaatngc ttggccggaa    720
gtcattanga nggctnaaaa ggccctgtta ngggtctggg ctnggtttta cccnacccat    780
ggaatncncc ccccggacna ntgnatccct attcttaa                            818
```

```
        <210> 7
        <211> 817
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(817)
        <223> n = A,T,C or G

        <400> 7
tttttttttt tttttttttt tggctctaga gggggtagag ggggtgctat agggtaaata     60
cgggccctat ttcaaagatt tttaggggaa ttaattctag gacgatgggt atgaaactgt    120
ggtttgctcc acagatttca gagcattgac cgtagtatac ccccggtcgt gtagcggtga    180
aagtggtttg gtttagacgt ccgggaattg catctgtttt taagcctaat gtggggacag    240
ctcatgagtg caagacgtct tgtgatgtaa ttattatacn aatgggggct tcaatcggga    300
gtactactcg attgtcaacg tcaaggagtc gcaggtcgcc tggttctagg aataatgggg    360
gaagtatgta ggaattgaag attaatccgc cgtagtcggt gttctcctag gttcaatacc    420
attggtggcc aattgatttg atggtaaggg gagggatcgt tgaactcgtc tgttatgtaa    480
aggatncctt ngggatggga aggcnatnaa ggactangga tnaatggcgg gcangatatt    540
tcaaacngtc tctanttcct gaaacgtctg aaatgttaat aanaattaan tttngttatt    600
gaatnttnng gaaaagggct tacaggacta gaaaccaaat angaaaanta atnntaangg    660
cnttatcntn aaaggtnata accnctccta tnatcccacc caatngnatt ccccacncnn    720
acnattggat nccccanttc canaaanggc cncccccccgg tgnannccnc cttttgttcc    780
cttnantgan ggttattcnc ccctngcntt atcancc                            817
```

```
        <210> 8
        <211> 799
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(799)
        <223> n = A,T,C or G

        <400> 8
catttccggg tttactttct aaggaaagcc gagcggaagc tgctaacgtg ggaatcggtg     60
cataaggaga actttctgct ggcacgcgct agggacaagc gggagagcga ctccgagcgt    120
ctgaagcgca cgtcccagaa ggtggacttg gcactgaaac agctgggaca catccgcgag    180
tacgaacagc gcctgaaagt gctggagcgg gaggtccagc agtgtagccg cgtcctgggg    240
tgggtggccg angcctganc cgctctgcct tgctgccccc angtgggccg ccaccccctg    300
acctgcctgg gtccaaacac tgagccctgc tggcggactt caagganaac ccccacangg    360
ggattttgct cctanantaa ggctcatctg ggcctcggcc ccccccacctg gttggccttg    420
tctttgangt gagccccatg tccatctggg ccactgtcng gaccaccttt ngggagtgtt    480
ctccttacaa ccacannatg cccggctcct ccggaaacc antcccancc tgngaaggat    540
caagncctgn atccactnnt nctanaaccg gccnccnccg cngtggaacc cnccttntgt    600
tcctttntcnt tnagggttaa tnncgccttg gccttnccan ngtcctncnc nttttccnnt    660
gttnaaattg ttangcnccc nccnntcccn cnncnncnan cccgaccnn annttnnann    720
```

ncctgggggt nccnncngat tgacccnncc nccctntant tgcnttnggg nncnntgccc   780
ctttccctct ngggannc g   799

            <210> 9
            <211> 801
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(801)
            <223> n = A,T,C or G

            <400> 9
acgccttgat cctcccaggc tgggactggt tctgggagga gccgggcatg ctgtggtttg   60
taangatgac actcccaaag gtggtcctga cagtggccca gatggacatg gggctcacct   120
caaggacaag gccaccaggt gcgggggccg aagcccacat gatccttact ctatgagcaa   180
aatcccctgt gggggcttct ccttgaagtc cgccancagg gctcagtctt tggacccang   240
caggtcatgg ggttgtngnc caactggggg ccncaacgca aaanggcnca gggcctcngn   300
cacccatccc angacgcggc tacactnctg gacctcccnc tccaccactt tcatgcgctg   360
ttcntacccg cgnatntgtc ccanctgttt cngtgccnac tccancttct nggacgtgcg   420
ctacatacgc ccggantcnc nctcccgctt tgtccctatc cacgtnccan caacaaattt   480
cnccntantg caccnattcc cacntttnnc agntttccnc nncgngcttc cttntaaaag   540
ggttganccc cggaaaatnc cccaaggggg ggggccngg tacccaactn ccccctnata   600
gctgaantcc ccatnaccnn gnctcnatgg anccntccnt tttaannacn ttctnaactt   660
gggaanancc ctcgnccntn cccccnttaa tcccnccttg cnangnncnt ccccccnntcc   720
nccc nnntng gcntntnann cnaaaaaggc ccnnnancaa tctcctnncn cctcanttcg   780
ccancccctcg aaatcggccn c   801

            <210> 10
            <211> 789
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(789)
            <223> n = A,T,C or G

            <400> 10
cagtctatnt ggccagtgtg gcagctttcc ctgtggctgc cggtgccaca tgcctgtccc   60
acagtgtggc cgtggtgaca gcttcagccg ccctcaccgg gttcaccttc tcagccctgc   120
agatcctgcc ctacacactg gcctccctct accaccggga gaagcaggtg ttcctgccca   180
aataccgagg ggacactgga ggtgctagca gtgaggacag cctgatgacc agcttcctgc   240
caggccctaa gcctggagct cccttcccta atggacacgt gggtgctgga ggcagtggcc   300
tgctcccacc tccacccgcg ctctgcgggg cctctgcctg tgatgtctcc gtacgtgtgg   360
tggtgggtga gcccaccgan gccagggtgg ttccgggccg gggcatctgc ctggacctcg   420
ccatcctgga tagtgcttcc tgctgtccca ngtggcccca tccctgttta tgggctccat   480
tgtccagctc agccagtctg tcactgccta tatggtgtct gccgcaggcc tgggtctggt   540
cccatttact ttgctacaca ggtantattt gacaagaacg anttggccaa atactcagcg   600
ttaaaaaatt ocagcaacat tggggggtgga aggcctgcct cactgggtcc aactcccgc   660
tcctgttaac cccatggggc tgccggcttg gccgccaatt tctgttgctg ccaaantnat   720
gtggctctct gctgccacct gttgctggct gaagtgcnta cngcncanct ngggggggtng   780
ggngttccc   789

```
<210> 11
<211> 772
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(772)
<223> n = A,T,C or G

<400> 11
cccaccctac ccaaatatta gacaccaaca cagaaaagct agcaatggat tcccttctac        60
tttgttaaat aaataagtta aatatttaaa tgcctgtgtc tctgtgatgg caacagaagg       120
accaacaggc cacatcctga taaaaggtaa gagggggggtg gatcagcaaa aagacagtgc       180
tgtgggctga ggggacctgg ttcttgtgtg ttgcccctca ggactcttcc cctacaaata       240
actttcatat gttcaaatcc catggaggag tgtttcatcc tagaaactcc catgcaagag       300
ctacattaaa cgaagctgca ggttaagggg cttanagatg ggaaaccagg tgactgagtt       360
tattcagctc ccaaaaaccc ttctctaggt gtgtctcaac taggaggcta gctgttaacc       420
ctgagcctgg gtaatccacc tgcagagtcc ccgcattcca gtgcatggaa cccttctggc       480
ctccctgtat aagtccagac tgaaacccccc ttggaaggnc tccagtcagg cagccctana       540
aactggggaa aaaagaaaag gacgcccccan cccccagctg tgcanctacg cacctcaaca       600
gcacagggtg gcagcaaaaa aaccacttta ctttggcaca aacaaaaact nggggggggca       660
accccggcac cccnangggg gttaacagga anncgggnaa cntggaaccc aattnaggca       720
ggcccnccac cccnaatntt gctgggaaat ttttcctccc ctaaattntt tc               772


<210> 12
<211> 751
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(751)
<223> n = A,T,C or G

<400> 12
gccccaattc cagctgccac accacccacg gtgactgcat tagttcggat gtcatacaaa        60
agctgattga agcaaccctc tacttttggg tcgtgagcct tttgcttggt gcaggtttca       120
ttggctgtgt tggtgacgtt gtcattgcaa cagaatgggg gaaaggcact gttctctttg       180
aagtanggtg agtcctcaaa atccgtatag ttggtgaagc cacagcactt gagccctttc       240
atggtggtgt tccacacttg agtgaagtct tcctgggaac cataatcttt cttgatggca       300
ggcactacca gcaacgtcag ggaagtgctc agccattgtg gtgtacacca aggcgaccac       360
agcagctgcn acctcagcaa tgaagatgan gaggangatg aagaagaacg tcncgagggc       420
acacttgctc tcagtcttan caccatanca gcccntgaaa accaananca aagaccacna       480
cnccggctgc gatgaagaaa tnaccccncg ttgacaaact tgcatggcac tgggancccac       540
agtggcccna aaaatcttca aaaggatgc cccatcnatt gacccccccaa atgcccactg       600
ccaacagggg ctgcccccacn cncnnaacga tganccccatt gnacaagatc tncntggtct       660
tnatnaacnt gaaccctgcn tngtggctcc tgttcaggnc cnnggcctga cttctnaann       720
aangaactcn gaagnccccca cnggananncc g                                     751


<210> 13
<211> 729
<212> DNA
<213> Homo sapien
```

```
<220>
<221> misc_feature
<222> (1)...(729)
<223> n = A,T,C or G

<400> 13
gagccaggcg tccctctgcc tgcccactca gtggcaacac ccgggagctg ttttgtcctt      60
tgtggancct cagcagtncc ctctttcaga actcantgcc aaganccctg aacaggagcc     120
accatgcagt gcttcagctt cattaagacc atgatgatcc tcttcaattt gctcatcttt     180
ctgtgtggtg cagccctgtt ggcagtgggc atctgggtgt caatcgatgg ggcatccttt     240
ctgaagatct tcgggccact gtcgtccagt gccatgcagt ttgtcaacgt gggctacttc     300
ctcatcgcag ccggcgttgt ggtcttagct ctaggtttcc tgggctgcta tggtgctaag     360
actgagagca agtgtgccct cgtgacgttc ttcttcatcc tcctcctcat cttcattgct     420
gaggttgcaa tgctgtggtc gccttggtgt acaccacaat ggctgagcac ttcctgacgt     480
tgctggtaat gcctgccatc aanaaaagat tatgggttcc caggaanact tcactcaagt     540
gttggaacac caccatgaaa gggctcaagt gctgtggctt cnnccaacta tacggatttt     600
gaagantcac ctacttcaaa gaaaanagtg cctttccccc atttctgttg caattgacaa     660
acgtcgccaa cacagccaat tgaaaacctg cacccaaccc aaangggtcc ccaaccanaa     720
attnaaggg                                                             729
```

```
<210> 14
<211> 816
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(816)
<223> n = A,T,C or G

<400> 14
tgctcttcct caaagttgtt cttgttgcca taacaaccac cataggtaaa gcgggcgcag      60
tgttcgctga aggggttgta gtaccagcgc gggatgctct ccttgcagag tcctgtgtct     120
ggcaggtcca cgcagtgccc tttgtcactg gggaaatgga tgcgctggag ctcgtcaaag     180
ccactcgtgt atttttcaca ggcagcctcg tccgacgcgt cggggcagtt ggggggtgtct     240
tcacactcca ggaaactgtc natgcagcag ccattgctgc agcggaactg ggtgggctga     300
cangtgccag agcacactgg atggcgcctt tccatgnnan gggccctgng ggaaagtccc     360
tgancccan anctgcctct caaangcccc accttgcaca ccccgacagg ctagaatgga     420
atcttcttcc cgaaaggtag ttnttcttgt tgcccaancc ancccntaa acaaactctt     480
gcanatctgc tccgnggggg tcntantacc ancgtgggaa aagaacccca ggcngcgaac     540
caancttgtt tggatncgaa gcnataatct nctnttctgc ttggtggaca gcaccantna     600
ctgtnnanct ttagnccntg gtcctcntgg gttgnncttg aacctaatcn ocnntcaact     660
gggacaaggt aantngccnt cctttnaatt cccnancntn ccccctggtt tggggttttn     720
cncnctccta ccccagaaan nccgtgttcc cccccaacta ggggccnaaa ccnnttnttc     780
cacaaccctn ccccacccac gggttcngnt ggttng                               816
```

```
<210> 15
<211> 783
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(783)
<223> n = A,T,C or G
```

<400> 15

```
ccaaggcctg ggcaggcata nacttgaagg tacaacccca ggaacccctg gtgctgaagg    60
atgtggaaaa cacagattgg cgcctactgc ggggtgacac ggatgtcagg gtagagagga   120
aagacccaaa ccaggtggaa ctgtggggac tcaaggaang cacctacctg ttccagctga   180
cagtgactag ctcagaccac ccagaggaca cggccaacgt cacagtcact gtgctgtcca   240
ccaagcagac agaagactac tgcctcgcat ccaacaangt gggtcgctgc cggggctctt   300
tcccacgctg gtactatgac cccacggagc agatctgcaa gagtttcgtt tatggaggct   360
gcttgggcaa caagaacaac taccttcggg aagaagagtg cattctancc tgtcngggtg   420
tgcaaggtgg gcctttgana ngcanctctg gggctcangc gactttcccc cagggcccct   480
ccatggaaag gcgccatcca ntgttctctg gcacctgtca gcccacccag ttccgctgca   540
ncaatggctg ctgcatcnac antttcctng aattgtgaca acacccccca ntgcccccaa   600
ccctcccaac aaagcttccc tgttnaaaaa tacnccattt ggctttttnac aaacncccgg   660
cncctccntt ttccccnntn aacaaagggc nctngcnttt gaactgcccn aacccnggaa   720
tctnccnngg aaaaantncc cccctggtt cctnnaancc cctccncaa  anctnccccc   780
ccc                                                                783
```

```
<210> 16
<211> 801
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(801)
<223> n = A,T,C or G
```

<400> 16

```
gccccaattc cagctgccac accacccacg gtgactgcat tagttcggat gtcatacaaa    60
agctgattga agcaaccctc tactttttgg tcgtgagcct tttgcttggt gcaggtttca   120
ttggctgtgt tggtgacgtt gtcattgcaa cagaatgggg gaaaggcact gttctctttg   180
aagtagggtg agtcctcaaa atccgtatag ttggtgaagc cacagcactt gagccctttc   240
atggtggtgt tccacacttg agtgaagtct tcctgggaac cataatcttt cttgatggca   300
ggcactacca gcaacgtcag gaagtgctca gccattgtgg tgtacaccaa ggcgaccaca   360
gcagctgcaa cctcagcaat gaagatgagg aggaggatga agaagaacgt cncgagggca   420
cacttgctct ccgtcttagc accatagcag cccangaaac caagagcaaa gaccacaacg   480
ccngctgcga atgaaagaaa ntacccacgt tgacaaactg catggccact ggacgacagt   540
tggcccgaan atcttcagaa aagggatgcc ccatcgattg aacacccana tgcccactgc   600
cnacagggct gcnccncncn gaaagaatga gccattgaag aaggatcntc ntggtcttaa   660
tgaactgaaa ccntgcatgg tggcccctgt tcagggctct tggcagtgaa ttctganaaa   720
aaggaacngc ntnagccccc ccaaangana aaacaccccc gggtgttgcc ctgaattggc   780
ggccaaggan ccctgccccn g                                             801
```

```
<210> 17
<211> 740
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(740)
<223> n = A,T,C or G
```

<400> 17

```
gtgagagcca ggcgtccctc tgcctgccca ctcagtggca acacccggga gctgttttgt    60
```

```
cctttgtgga gcctcagcag ttccctcttt cagaactcac tgccaagagc cctgaacagg    120
agccaccatg cagtgcttca gcttcattaa gaccatgatg atcctcttca atttgctcat    180
ctttctgtgt ggtgcagccc tgttggcagt gggcatctgg gtgtcaatcg atggggcatc    240
ctttctgaag atcttcgggc cactgtcgtc cagtgccatg cagtttgtca cgtgggcta     300
cttcctcatc gcagccggcg ttgtggtctt tgctcttggt ttcctgggct gctatggtgc    360
taagacggag agcaagtgtg ccctcgtgac gttcttcttc atcctcctcc tcatcttcat    420
tgctgaagtt gcagctgctg tggtcgcctt ggtgtacacc acaatggctg aaccattcct    480
gacgttgctg gtantgcctg ccatcaanaa agattatggg ttcccaggaa aaattcactc    540
aantntggaa caccnccatg aaaagggctc caatttctgn tggcttcccc aactataccg    600
gaattttgaa agantcnccc tacttccaaa aaaaaanant tgcctttncc cccnttctgt    660
tgcaatgaaa acntcccaan acngccaatn aaaacctgcc cnnncaaaaa ggntcncaaa    720
caaaaaaant nnaagggttn                                                740
```

        <210> 18
        <211> 802
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(802)
        <223> n = A,T,C or G

        <400> 18
```
ccgctggttg cgctggtcca gngnagccac gaagcacgtc agcatacaca gcctcaatca      60
caaggtcttc cagctgccgc acattacgca gggcaagagc ctccagcaac actgcatatg     120
ggatacactt tactttagca gccagggtga caactgagag gtgtcgaagc ttattcttct     180
gagcctctgt tagtggagga agattccggg cttcagctaa gtagtcagcg tatgtcccat     240
aagcaaacac tgtgagcagc cggaaggtag aggcaaagtc actctcagcc agctctctaa     300
cattgggcat gtccagcagt tctccaaaca cgtagacacc agnggcctcc agcacctgat     360
ggatgagtgt ggccagcgct gcccccttgg ccgacttggc taggagcaga aattgctcct     420
ggttctgccc tgtcaccttc acttccgcac tcatcactgc actgagtgtg ggggacttgg     480
gctcaggatg tccagagacg tggttccgcc ccctcnctta atgacaccgn ccanncaacc     540
gtcggctccc gccgantgng ttcgtcgtnc ctgggtcagg gtctgctggc cnctacttgc     600
aancttcgtc nggcccatgg aattcaccnc accggaactn gtangatcca ctnnttctat     660
aaccggncgc caccgcnnnt ggaactccac tcttnttncc tttacttgag ggttaaggtc     720
accttnncg ttaccttggt ccaaaccntn ccntgtgtcg anatngtnaa tcggnccna      780
tnccanccnc atangaagcc ng                                             802
```

        <210> 19
        <211> 731
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(731)
        <223> n = A,T,C or G

        <400> 19
```
cnaagcttcc aggtnacggg ccgcnaancc tgacccnagg tancanaang cagncngcgg      60
gagcccaccg tcacgnggng gngtctttat nggaggggc ggagccacat cnctggacnt     120
cntgacccca actccccncc ncncantgca gtgatgagtg cagaactgaa ggtnacgtgg     180
caggaaccaa gancaaannc tgctccnntc caagtcggcn naggggggcgg ggctggccac     240
gcncatccnt cnagtgctgn aaagcccccnn cctgtctact tgtttggaga acngcnnnga     300
```

```
catgcccagn gttanataac nggcngagag tnantttgcc tctcccttcc ggctgcgcan      360
cgngtntgct tagnggacat aacctgacta cttaactgaa cccnngaatc tnccncccct      420
ccactaagct cagaacaaaa aacttcgaca ccactcantt gtcacctgnc tgctcaagta      480
aagtgtaccc catncccaat gtntgctnga ngctctgncc tgcnttangt tcggtcctgg      540
gaagacctat caattnaagc tatgtttctg actgcctctt gctccctgna acaancnacc      600
cnncnntcca agggggggnc ggccccaat ccccccaacc ntnaattnan tttanccccn       660
ccccnggcc cggccttta cnancntcnn nnacngggna aaacnnngc tttncccaac         720
nnaatccncc t                                                          731
```

        <210> 20
        <211> 754
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(754)
        <223> n = A,T,C or G

        <400> 20
```
tttttttttt tttttttttt taaaaacccc ctccattnaa tgnaaacttc cgaaattgtc       60
caacccctc ntccaaatnn ccntttccgg gnggggggttc caaacccaan ttannttttgg     120
annttaaatt aaatnttnnt tggnggnnna anccnaatgt nangaaagtt naacccanta      180
tnancttnaa tnccctggaaa ccngtngntt ccaaaaatnt ttaaccctta antccctccg     240
aaatngttna nggaaaaccc aanttctcnt aaggttgttt gaaggntnaa tnaaaanccc      300
nnccaattgt ttttngccac gcctgaatta attggnttcc gntgttttcc nttaaaanaa      360
ggnnanccccc ggttantnaa tcccccccnnc cccaattata ccganttttt ttngaattgg    420
ganccccncgg gaattaacgg ggnnnntccc tnttgggggg cnggnncccc ccccntcggg     480
ggttngggnc aggncnnaat tgtttaaggg tccgaaaaat ccctccnaga aaaaaanctc      540
ccaggntgag nntngggttt ncccccccccc canggcccct ctcgnanagt tggggtttgg     600
ggggcctggg atttntnttc ccctnttncc tccccccccc ccngggananag aggttngngt    660
tttgntcnnc ggccccnccn aagancttttn ccganttnan ttaaatccnt gcctnggcga     720
agtccnttgn agggntaaan ggcccccctnn cggg                                 754
```

        <210> 21
        <211> 755
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(755)
        <223> n = A,T,C or G

        <400> 21
```
atcancccat gaccccnaac nngggaccnc tcanccggnc nnncnaccnc cggccnatca       60
nngtnagnnc actncnnttn natcacnccc cnccnactac gcccncnanc cnacgcncta      120
nncanatncc actganngcg cgangtngan ngagaaanct nataccanag ncaccanacn      180
ccagctgtcc nanaangcct nnnatacngg nnnatccaat ntgnancctc cnaagtattn      240
nncnncanat gatttcctn anccgattac ccntnccccc tanccctcc ccccaacna        300
cgaaggcnct ggnccnaagg nngcgncncc ccgctagntc cccnncaagt cncncnccta      360
aactcanccn nattacncgc ttcntgagta tcactcccg aatctcaccc tactcaactc       420
aaaaaanatcn gatacaaaat aatncaagcc tgnttatnac actntgactg ggtctctatt     480
ttagnggtcc ntnaancntc ctaatacttc cagtctncct tcnccaattt ccnaanggct      540
ctttcngaca gcatnttttg gttcccnntt gggttcttan ngaattgccc ttcntngaac      600
```

```
gggctcntct tttccttcgg ttancctggn ttcnnccggc cagttattat ttcccntttt        660
aaattcntnc cnttttanttt tggcnttcna aaccccggc cttgaaaacg gcccctggt         720
aaaggttgt tttganaaaa tttttgtttt gttcc                                   755
```

        <210> 22
        <211> 849
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(849)
        <223> n = A,T,C or G

        <400> 22
```
tttttttttt tttttangtg tngtcgtgca ggtagaggct tactacaant gtgaanacgt        60
acgctnggan taangcgacc cganttctag gannncncct aaaatcanac tgtgaagatn       120
atcctgnnna cggaanggtc accggnngat nntgctaggg tgnccnctcc cannncnttn       180
cataactcng nggccctgcc caccaccttc ggcggcccng ngnccgggcc cgggtcattn       240
gnnttaaccn cactnngcna ncggtttccn ncccnnncng acccnggcga tccggggtnc       300
tctgtcttcc cctgnagncn anaaantggg ccncggnccc ctttacccct nnacaagcca       360
cngccntcta nccncngccc cccctccant nnggggggact gccnanngct ccgttnctng      420
nnacccennn gggtncctcg gttgtcgant cnaccgnang ccanggattc cnaaggaagg       480
tgcgttnttg gccctaccc ttcgctncgg nncacccttc ccgacnanga nccgctcccg        540
cncnncgnng cctcncctcg caacacccgc nctcntcngt ncggnnncec ccccacccgc       600
nccctcncnc ngncgnancn ctccnccncc gtctcannca ccaccccgcc ccgccaggcc       660
ntcanccacn ggnngacnng nagcncnntc gcnccgcgcn gcgncnccct cgccncngaa       720
ctncntcngg ccantnncgc tcaanccnna cnaaacgccg ctgcgcggcc cgnagcgncc       780
ncctccncga gtcctcccgn cttccnaccc angnnttccn cgaggacacn nnaccccgcc       840
nncangcgg                                                               849
```

        <210> 23
        <211> 872
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(872)
        <223> n = A,T,C or G

        <400> 23
```
gcgcaaacta tacttcgctc gnactcgtgc gcctcgctnc tcttttcctc cgcaaccatg        60
tctgacnanc ccgattnggc ngatatcnan aagntcganc agtccaaact gantaacaca       120
cacacncnan aganaaatcc nctgccttcc anagtanacn attgaacnng agaaccangc       180
nggcgaatcg taatnaggcg tgcgccgcca atntgtcncc gtttattntn ccagcntcnc       240
ctnccnaccc tacntcttcn nagctgtcnn acccctngtn cgnacccccc naggtcggga       300
tcgggtttnn nntgaccgng cnncccctcc cccntccat nacganccnc ccgcaccacc       360
nanngcncgc ncccgnnct cttcgccncc ctgtcctntn ccctgtngc ctggcncngn        420
accgcattga ccctcgccnn ctncnngaaa ncgnanacgt ccgggttgnn annancgctg       480
tgggnnngcg tctgcnccgc gttccttccn ncnncttcca ccatcttcnt tacngggtct       540
ccncgccntc tcnnncacnc cctgggacgc tntcctntgc ccccttnac tccccccctt       600
cgncgtgncc cgnccccacc ntcatttnca nacgntcttc acaannncct ggntnnctcc       660
cnancngncn gtcanccnag ggaagggngg ggnnccnntg nttgacgttg nggngangtc       720
cgaananntcc tcnccntcan cnctacccct cgggcgnnct ctcngttncc aacttancaa       780
```

```
ntctccccccg ngngcncntc tcagcctcnc ccncccccnct ctctgcantg tnctctgctc      840
tnaccnntac gantnttcgn cnccctcttt cc                                      872
```

```
        <210> 24
        <211> 815
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(815)
        <223> n = A,T,C or G


        <400> 24
gcatgcaagc ttgagtattc tatagngtca cctaaatanc ttggcntaat catggtcnta        60
nctgncttcc tgtgtcaaat gtatacnaan tanatatgaa tctnatntga caaganngta       120
tcntncatta gtaacaantg tnntgtccat cctgtcngan canattccca tnnattncgn       180
cgcattcncn gcncantatn taatngggaa ntcnnntnnn ncaccnncat ctatcntncc       240
gcnccctgac tggnagagat ggatnanttc tnntntgacc nacatgttca tcttggattn       300
aananccccc cgcngnccac cggttngnng cnagccnntc ccaagacctc ctgtggaggt       360
aacctgcgtc aganncatca aacntgggaa acccgcnncc angtnnaagt ngnnncanan       420
gatcccgtcc aggntttacc atcccttcnc agcgcccccct ttngtgcctt anagngnagc      480
gtgtccnanc cnctcaacat ganacgcgcc agnccanccg caattnggca caatgtcgnc       540
gaacccccta gggggantna tncaaanccc caggattgtc cncncangaa atcccncanc       600
cccnccctac ccnnctttgg gacngtgacc aantcccgga gtnccagtcc ggccngnctc       660
ccccaccggt nnccntgggg gggtgaanct cngnntcanc cngncgaggn ntcgnaagga       720
accggncctn ggncgaanng ancnntcnga agngccncnt cgtataaccc ccctcncca       780
nccnacngnt agntcccccc cngggtncgg aangg                                  815
```

```
        <210> 25
        <211> 775
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(775)
        <223> n = A,T,C or G


        <400> 25
ccgagatgtc tcgctccgtg gccttagctg tgctcgcgct actctctctt tctggcctgg        60
aggctatcca gcgtactcca aagattcagg tttactcacg tcatccagca gagaatggaa       120
agtcaaattt cctgaattgc tatgtgtctg ggtttcatcc atccgacatt gaanttgact       180
tactgaagaa tgganagaga attgaaaaag tggagcattc agacttgtct ttcagcaagg       240
actggtcttt ctatctcntg tactacactg aattcacccc cactgaaaaa gatgagtatg       300
cctgccgtgt gaaccatgtg actttgtcac agcccaagat agttaagtgg gatcgagaca       360
tgtaagcagn cnncatggaa gtttgaagat gccgcatttg gattggatga attccaaatt       420
ctgcttgctt gcnttttaat antgatatgc ntatacaccc tacccttat gnccccaaat        480
tgtaggggtt acatnantgt tcncntngga catgatcttc ctttataant ccnccnttcg       540
aattgcccgt cnccengttn ngaatgtttc cnnaaccacg gttggctccc ccaggtcncc       600
tcttacggaa gggcctgggc cnctttncaa ggttgggga accnaaaatt tcncttntgc        660
ccncccncca cnntcttgng nncncanttt ggaacccttc cnattccccct tggcctcnna      720
ncccttnncta anaaaacttn aaancgtngc naaanntttn acttccccccc ttacc          775
```

```
        <210> 26
```

```
<211> 820
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(820)
<223> n = A,T,C or G

<400> 26
anattantac agtgtaatct tttcccagag gtgtgtanag ggaacggggc ctagaggcat      60
cccanagata ncttatanca acagtgcttt gaccaagagc tgctgggcac atttcctgca     120
gaaaaggtgg cggtcccat cactcctcct ctcccatagc catcccagag gggtgagtag      180
ccatcangcc ttcggtggga gggagtcang gaaacaacan accacagagc anacagacca     240
ntgatgacca tgggcgggag cgagcctctt ccctgnaccg gggtggcana nganagccta     300
nctgaggggt cacactataa acgttaacga ccnagatnan cacctgcttc aagtgcaccc     360
ttcctacctg acnaccagng accnnnaact gcngcctggg gacagcnctg ggancagcta     420
acnnagcact cacctgcccc cccatggccg tncgcntccc tggtcctgnc aagggaagct     480
ccctgttgga attncgggga naccaaggga nccccctcct ccanctgtga aggaaaaann     540
gatggaattt tncccttccg gccnntcccc tcttcctta cacgcccccct nntactcntc     600
tccctctntt ntcctgncnc acttttnacc ccnnnatttc ccttnattga tcggannctn     660
ganattccac tnncgcctnc cntcnatcng naanacnaaa nactntctna cccngggat      720
gggnncctcg ntcatcctct cttttcnct accnccnntt ctttgcctct ccttngatca
780tccaaccntc gntggccntn cccccccnnn tcctttnccc
820


<210> 27
<211> 818
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(818)
<223> n = A,T,C or G

<400> 27
tctgggtgat ggcctcttcc tcctcaggga cctctgactg ctctgggcca aagaatctct      60
tgtttcttct ccgagcccca ggcagcggtg attcagccct gcccaacctg attctgatga     120
ctgcggatgc tgtgacggac ccaaggggca aatagggtcc cagggtccag ggagggcgc      180
ctgctgagca cttccgcccc tcaocctgcc cagccctgc catgagctct gggctgggtc     240
tccgcctcca gggttctgct cttccangca ngccancaag tggcgctggg ccacactggc     300
ttcttcctgc cccntccctg gctctgantc tctgtcttcc tgtcctgtgc angcnccttg     360
gatctcagtt tccctcnctc anngaactct gtttctgann tcttcantta actntgantt     420
tatnaccnan tggnctgtnc tgtcnnactt taatgggccn gaccggctaa tccctccctc     480
nctcccttcc anttcnnnna accngcttnc cntcntctcc ccntancccg ccnggaanc     540
ctcctttgcc ctnaccangg gccnnnaccg cccntnnctn gggggcnng gtnnctncnc     600
ctgntnnccc cnctcncnnt tncctcgtcc cnncncgcn nngcanntc ncngtcccnn     660
tnnctcttcn ngtntcgnaa ngntcncntn tnnnngncn ngntnntncn tccctctcnc     720
cnnntgnang tnnttnnnnc ncngnncccc nnnncnnnnn nggnnntnnn tctncncngc     780
cccnnccccc ngnattaagg cctccnntct ccggccnc
818


<210> 28
<211> 731
<212> DNA
```

<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(731)
<223> n = A,T,C or G

<400> 28
```
aggaagggcg gagggatatt gtangggatt gagggatagg agnataangg gggaggtgtg      60
tcccaacatg anggtgnngt tctcttttga angagggttg ngttttann ccnggtgggt      120
gattnaaccc cattgtatgg agnnaaaggn tttnagggat ttttcggctc ttatcagtat      180
ntanattcct gtnaatcgga aaatnatntt tcnncnggaa aatnttgctc ccatccgnaa      240
attnctcccg ggtagtgcat nttnggggggn cngccangtt tcccaggctg ctanaatcgt      300
actaaagntt naagtgggan tncaaatgaa aacctnncac agagnatccn tacccgactg      360
tnnnttncct tcgccctntg actctgcnng agcccaatac ccnngngnat gtcncccngn      420
nnngcgncnc tgaaannnnc tcgnggctnn gancatcang gggtttcgca tcaaaagcnn      480
cgtttcncat naaggcactt tngcctcatc caaccnctng ccctcnncca tttngccgtc      540
nggttcncct acgctnntng cncctnnntn ganatttttnc ccgcctnggg naancctcct      600
gnaatgggta gggncttntc ttttnaccnn gnggtntact aatcnnctnc acgcntncct      660
tctcnacccc cccccttttt caatcccanc ggcnaatggg gtctccccnn cganggggggg     720
nnncccannc c                                                          731
```

<210> 29
<211> 822
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(822)
<223> n = A,T,C or G

<400> 29
```
actagtccag tgtggtggaa ttccattgtg ttggggncnc ttctatgant antnttagat      60
cgctcanacc tcacanccetc ccnacnangc ctataangaa nannaataga nctgtncnnt     120
atntntacnc tcatanncct cnnnacccac tccctcttaa cccntactgt gcctatngcn      180
tnnctantct ntgccgcctn cnanccaccn gtgggccnac cncnngnatt ctcnatctcc      240
tcnccatntn gcctananta ngtncatacc ctatacctac nccaatgcta nnnctaancn      300
tccatnantt annntaacta ccactgacnt ngactttcnc atnanctcct aatttgaatc      360
tactctgact cccacngcct annnattagc ancntccccc nacnatntct caaccaaatc      420
ntcaacaacc tatctanctg ttcnccaacc nttncctccg atccccnnac aaccccctc      480
ccaaataccc nccacctgac ncctaacccn caccatcccg gcaagccnan ggncatttan     540
ccactggaat cacnatngga naaaaaaaac ccnaactctc tancncnnat ctccctaana     600
aatnctcctn naatttactn ncantnccat caanccacn tgaaacnnaa cccctgtttt      660
tanatccctt ctttcgaaaa ccnacccttt annncccaac ctttngggcc cccccnctnc     720
ccnaatgaag gncncccaat cnangaaacg nccntgaaaa ancnaggcna anannntccg      780
canatcctat cccttanttn ggggnccctt ncccngggcc cc                        822
```

<210> 30
<211> 787
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature

```
<222> (1)...(787)
<223> n = A,T,C or G

<400> 30
cggccgcctg ctctggcaca tgcctcctga atggcatcaa aagtgatgga ctgcccattg    60
ctagagaaga ccttctctcc tactgtcatt atggagccct gcagactgag ggctcccctt   120
gtctgcagga tttgatgtct gaagtcgtgg agtgtggctt ggagctcctc atctacatna   180
gctggaagcc ctggagggcc tctctcgcca gcctccccct tctctccacg ctctccangg   240
acaccagggg ctccaggcag cccattattc ccagnangac atggtgtttc tccacgcgga   300
cccatggggc ctgnaaggcc agggtctcct ttgacaccat ctctcccgtc ctgcctggca   360
ggccgtggga tccactantt ctanaacggn cgccaccncg gtgggagctc cagcttttgt   420
tcccnttaat gaaggttaat tgcncgcttg gcgtaatcat nggtcanaac tntttcctgt   480
gtgaaattgt ttntcccctc ncnattccnc ncnacatacn aacccggaan cataaagtgt   540
taaagcctgg gggtngcctn nngaatnaac tnaactcaat taattgcgtt ggctcatggc   600
ccgctttccn ttcnggaaaa ctgtcntccc ctgcnttnnt gaatcggcca ccccccnggg   660
aaaagcggtt tgcntttttng ggggntcctt ccncttcccc cctcnctaan ccctncgcct   720
cggtcgttnc nggtngcggg gaangggnat nnnctcccnc naaggggggng agnnngntat   780
ccccaaa                                                             787
```

```
<210> 31
<211> 799
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(799)
<223> n = A,T,C or G
```

```
<400> 31
tttttttttt ttttttggc gatgctactg tttaattgca ggaggtgggg gtgtgtgtac    60
catgtaccag ggctattaga agcaagaagg aaggagggag ggcagagcgc cctgctgagc   120
aacaaaggac tcctgcagcc ttctctgtct gtctcttggc gcaggcacat ggggaggcct   180
cccgcagggt ggggccacc agtccagggg tgggagcact acanggggtg ggagtgggtg   240
gtggctggtn cnaatggcct gncacanatc cctacgattc ttgacacctg gatttcacca   300
ggggaccttc tgttctccca nggnaacttc ntnnatctcn aaagaacaca actgtttctt   360
cngcanttct ggctgttcat ggaaagcaca ggtgtccnat ttnggctggg acttggtaca   420
tatggttccg gcccacctct cocntcnaan aagtaattca ccccccccccn ccntctnttg   480
cctgggccct taantaccca caccggaact canttantta ttcatcttng gntgggcttg   540
ntnatcnccn cctgaangcg ccaagttgaa aggccacgcc gtncocnctc cccatagnan   600
nttttnncnt canctaatgc cccccnggc aacnatccaa tcccccccccn tggggggcccc   660
agcccanggc ccccgnctcg ggnnnccngn cncgnantcc ccaggntctc ccantcngnc   720
ccnnngcncc cccgcacgca gaacanaagg ntngagccnc cgcannnnnn nggtnncac    780
ctcgccccccc ccnncgnng                                                799
```

```
<210> 32
<211> 789
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(789)
<223> n = A,T,C or G
```

```
<400> 32
tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt    60
ttttnccnag ggcaggttta ttgacaacct cncgggacac aancaggctg gggacaggac   120
ggcaacaggc tccggcggcg gcggcggcgg ccctacctgc ggtaccaaat ntgcagcctc   180
cgctcccgct tgatnttcct ctgcagctgc aggatgccnt aaaacagggc ctcggccntn   240
ggtgggcacc ctgggatttn aatttccacg ggcacaatgc ggtcgcancc cctcaccacc   300
nattaggaat agtggtntta cccnccnccg ttggcncact ccccntggaa accacttntc   360
gcggctccgg catctggtct taaaccttgc aaacnctggg gccctctttt tggttantnt   420
nccngccaca atcatnactc agactggcnc gggctggccc caaaaaancn ccccaaaacc   480
ggnccatgtc ttnncggggt tgctgcnatn tncatcacct cccgggcnca ncaggncaac   540
ccaaaagttc ttgnggcccn caaaaaanct ccggggggnc ccagtttcaa caaagtcatc   600
cccttggcc cccaaatcct ccccccgntt nctgggtttg ggaacccacg cctctnnctt   660
tggnnggcaa gntggntccc ccttcgggcc cccggtgggc ccnnctctaa ngaaaacncc   720
ntcctnnnca ccatccccccc nngnnacgnc tancaangna tccctttttt tanaaacggg   780
cccccncg                                                           789


<210> 33
<211> 793
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(793)
<223> n = A,T,C or G

<400> 33
gacagaacat gttggatggt ggagcacctt tctatacgac ttacaggaca gcagatgggg    60
aattcatggc tgttggagca atanaacccc agttctacga gctgctgatc aaaggacttg   120
gactaaagtc tgatgaactt cccaatcaga tgagcatgga tgattggcca gaaatgaana   180
agaagtttgc agatgtattt gcaaagaaga cgaaggcaga gtggtgtcaa atctttgacg   240
gcacagatgc ctgtgtgact ccggttctga cttttgagga ggttgttcat catgatcaca   300
acaangaacg gggctcgttt atcaccantg aggagcagga cgtgagcccc cgccctgcac   360
ctctgctgtt aaacacccca gccatccctt ctttcaaaag ggatccacta cttctagagc   420
ggncgccacc gcggtggagc tccagctttt gttcccttta gtgagggtta attgcgcgct   480
tggcgtaatc atggtcatan ctgtttcctg tgtgaaattg ttatccgctc acaattccac   540
acaacatacg anccggaagc atnaaatttt aaagcctggn ggtngcctaa tgantgaact   600
nactcacatt aattggcttt gcgctcactg cccgctttcc agtccggaaa acctgtcctt   660
gccagctgcc nttaatgaat cnggccaccc cccgggggaaa aggcngtttg cttnttgggg   720
cgcncttccc gctttctcgc ttcctgaant ccttcccccc ggtctttcgg cttgcggcna   780
acggtatcna cct                                                     793


<210> 34
<211> 756
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(756)
<223> n = A,T,C or G

<400> 34
gccgcgaccg gcatgtacga gcaactcaag ggcgagtgga accgtaaaag ccccaatctt    60
ancaagtgcg gggaanagct gggtcgactc aagctagttc ttctggagct caacttcttg   120
```

```
ccaaccacag ggaccaagct gaccaaacag cagctaattc tggcccgtga catactggag    180
atcggggccc aatggagcat cctacgcaan gacatcccct ccttcgagcg ctacatggcc    240
cagctcaaat gctactactt tgattacaan gagcagctcc ccgagtcagc ctatatgcac    300
cagctcttgg gcctcaacct cctcttcctg ctgtcccaga accgggtggc tgantnccac    360
acgganttgg ancggctgcc tgcccaanga catacanacc aatgtctaca tcnaccacca    420
gtgtcctgga gcaatactga tgganggcag ctaccncaaa gtnttcctgg ccnagggtaa    480
catcccccgc cgagagctac accttcttca ttgacatcct gctcgacact atcagggatg    540
aaaatcgcng ggttgctcca gaaaggctnc aanaanatcc ttttcnctga aggcccccgg    600
atncnctagt nctagaatcg gcccgccatc gcggtgganc ctccaacctt tcgttnccct    660
ttactgaggg ttnattgccg cccttggcgt tatcatggtc acnccngttn cctgtgttga    720
aattnttaac cccccacaat tccacgccna cattnng                            756
```

        <210> 35
        <211> 834
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(834)
        <223> n = A,T,C or G

        <400> 35
```
ggggatctct anatcnacct gnatgcatgg ttgtcggtgt ggtcgctgtc gatgaanatc     60
aacaggatct tgcccttgaa gctctcggct gctgtnttta agttgctcag tctgccgtca    120
tagtcagaca cnctcttggg caaaaaacan caggatntga gtcttgattt cacctccaat    180
aatcttcngg gctgtctgct cggtgaactc gatgacnang ggcagctggt tgtgtntgat    240
aaantccanc angttctcct tggtgacctc cccttcaaag ttgttccggc cttcatcaaa    300
cttctnnaan angannancc canctttgtc gagctggnat ttgganaaca cgtcacngtt    360
ggaaactgat cccaaatggt atgtcatcca tcgcctctgc tgcctgcaaa aaacttgctt    420
ggcncaaatc cgactccccn tccttgaaag aagccatca caccccctc cctggactcc      480
nncaangact ctnccgctnc cccntccnng cagggttggt ggcannccgg gcccntgcgc    540
ttcttcagcc agttcacnat nttcatcagc ccctctgcca gctgttntat tccttggggg    600
ggaanccgtc tctcccttcc tgaannaact ttgaccgtng gaatagccgc gcntcnccnt    660
acntnctggg ccgggttcaa antccctccn ttgncnntcn cctcgggcca ttctggattt    720
nccnaacttt ttccttcccc cnccncncgg ngtttggntt tttcatnggg ccccaactct    780
gctnttggcc antcccctgg gggcntntan cncccccctnt ggtcccntng ggcc          834
```

        <210> 36
        <211> 814
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(814)
        <223> n = A,T,C or G

        <400> 36
```
cggncgcttt ccngccgcgc cccgtttcca tgacnaaggc tcccttcang ttaaatacnn     60
cctagnaaac attaatgggt tgctctacta atacatcata cnaaccagta agcctgccca    120
naacgccaac tcaggccatt cctaccaaag gaagaaaggc tggtctctcc accccctgta    180
ggaaaggcct gccttgtaag acaccacaat ncggctgaat ctnaagtctt gtgttttact    240
aatggaaaaa aaaaataaac aanaggtttt gttctcatgg ctgcccaccg cagcctggca    300
ctaaaacanc ccagcgctca cttctgcttg ganaaatatt ctttgctctt ttggacatca    360
```

```
ggcttgatgg tatcactgcc acntttccac ccagctgggc nccccttcccc catntttgtc          420
antganctgg aaggcctgaa ncttagtctc caaaagtctc ngcccacaag accggccacc          480
aggggangtc ntttncagtg gatctgccaa anantacccn tatcatcnnt gaataaaaag          540
gcccctgaac ganatgcttc cancancctt taagacccat aatcctngaa ccatggtgcc          600
cttccggtct gatccnaaag gaatgttcct gggtcccant ccctcctttg ttncttacgt          660
tgtnttggac ccntgctngn atnacccaan tganatcccc ngaagcaccc tnccctggc           720
atttganttt cntaaattct ctgccctacn nctgaaagca cnattccctn ggcnccnaan          780
ggngaactca agaaggtctn ngaaaaacca cncn                                      814
```

        <210> 37
        <211> 760
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(760)
        <223> n = A,T,C or G

        <400> 37
```
gcatgctgct cttcctcaaa gttgttcttg ttgccataac aaccaccata ggtaaagcgg           60
gcgcagtgtt cgctgaaggg gttgtagtac cagcgcggga tgctctcctt gcagagtcct          120
gtgtctggca ggtccacgca atgccctttg tcactgggga aatggatgcg ctggagctcg          180
tcnaanccac tcgtgtattt ttcacangca gcctcctccg aagcntccgg gcagttgggg          240
gtgtcgtcac actccactaa actgtcgatn cancagccca ttgctgcagc ggaactgggt          300
gggctgacag gtgccagaac acactggatn ggcctttcca tggaagggcc tcggggaaat          360
cncctnancc caaactgcct ctcaaaggcc accttgcaca ccccgacagg ctagaaatgc          420
actcttcttc ccaaacgtag ttgttcttgt tgcccaagca ncctccanca aaccaaaanc          480
ttgcaaaatc tgctccgtgg gggtcatnnn taccanggtt ggggaaanaa acccggcngn          540
ganccnectt gtttgaatgc naaggnaata atcctcctgt cttgcttggg tggaanagca          600
caattgaact gttaacnttg ggccgngttc cnctngggtg gtctgaaact aatcaccgtc          660
actggaaaaa ggtangtgcc ttccttgaat tcccaaantt cccctngntt tgggtnnttt          720
ctcctctncc ctaaaaatcg tnttcccccc ccntanggcg                                760
```

        <210> 38
        <211> 724
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(724)
        <223> n = A,T,C or G

        <400> 38
```
tttttttttt tttttttttt tttttttttt tttttaaaaa cccccctccat tgaatgaaaa          60
cttccnaaat tgtccaaccc cctcnnccaa atnnccattt ccggggggggg gttccaaacc          120
caaattaatt ttgganttta aattaaatnt tnattngggg aanaanccaa atgtnaagaa          180
aatttaaccc attatnaact taaatnccctn gaaacccntg gnttccaaaa atttttaacc         240
cttaaatccc tccgaaattg ntaanggaaa accaaattcn cctaaggctn tttgaaggtt         300
ngatttaaac cccttnant tntttnacc cnngnctnaa ntatttngnt tccggtgttt           360
tccntntaan cntnggtaac tcccgntaat gaannnccct aanccaatta aaccgaattt         420
ttttttgaatt ggaaattccn ngggaattna ccggggtttt tcccntttgg gggccatncc         480
cccnctttcg gggtttgggn ntaggttgaa tttttnnang ncccaaaaaa nccccccaana        540
aaaaaactcc caagnnttaa ttngaatntc ccccttccca ggccttttgg gaaaggnggg         600
```

```
tttntggggg ccngggantt cnttcccccn ttnccncccc cccccnggt aaanggttat      660
ngnntttggt ttttgggccc cttnanggac cttccggatn gaaattaaat ccccgggncg      720
gccg                                                                  724
```

        <210> 39
        <211> 751
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(751)
        <223> n = A,T,C or G

        <400> 39
```
tttttttttt tttttctttg ctcacattta attttattt tgattttttt taatgctgca       60
caacacaata tttatttcat ttgtttcttt tatttcattt tatttgtttg ctgctgctgt      120
tttatttatt tttactgaaa gtgagaggga acttttgtgg ccttttttcc tttttctgta      180
ggccgcctta agctttctaa atttggaaca tctaagcaag ctgaanggaa aaggggggttt     240
cgcaaaatca ctcgggggaa nggaaaggtt gctttgttaa tcatgcccta tggtgggtga      300
ttaactgctt gtacaattac ntttcacttt taattaattg tgctnaangc tttaattana      360
cttgggggtt ccctccccan accaaccccn ctgacaaaaa gtgccngccc tcaaatnatg      420
tcccggcnnt cnttgaaaca cacngcngaa ngttctcatt ntccccncnc caggtnaaaa      480
tgaagggtta ccatntttaa cnccacctcc acntggcnnn gcctgaatcc tcnaaaancn      540
ccctcaancn aattnctnng ccccggtcnc gcntnngtc: cnccncgggct ccgggaantn      600
cacccccnga anncnntnnc naacnaaatt ccgaaaatat tcccnntcnc tcaattcccc      660
cnnagactnt cctcnncnan cncaattttc ttttnntcac gaacncgnnc cnnaaaatgn      720
nnnncncctc cnctngtccn naatcnccan c                                    751
```

        <210> 40
        <211> 753
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(753)
        <223> n = A,T,C or G

        <400> 40
```
gtggtatttt ctgtaagatc aggtgttcct ccctcgtagg tttagaggaa acaccctcat       60
agatgaaaac ccccccgaga cagcagcact gcaactgcca agcagccggg gtaggagggg      120
cgccctatgc acagctgggc ccttgagaca gcagggcttc gatgtcaggc tcgatgtcaa      180
tggtctggaa gcggcggctg tacctgcgta ggggcacacc gtcagggccc accaggaact      240
tctcaaagtt ccaggcaacn tcgttgcgac acaccggaga ccaggtgatn agcttggggt      300
cggtcataan cgcggtggcg tcgtcgctgg gagctggcag ggctcccgc aggaaggcna      360
ataaaaggtg cgccccgca ccgttcanct cgcacttctc naanaocatg angttgggct      420
cnaacccacc accannccgg acttccttga nggaattccc aaatctcttc gntcttgggc      480
ttctnctgat gccctanctg gttgcccngn atgccaanca nccccaancc ccggggtcct      540
aaancacccn cctcctcntt tcatctgggt tnttntcccc ggaccntggt tcctctcaag      600
ggancccata tctcnaccan tactcaccnt nccccccnt gnnacccanc cttctanngn       660
ttcccnccccg ncctctggcc cntcaaanan gcttncacna cctgggtctg ccttccccc      720
tnccctatct gnaccccncn tttgtctcan tnt                                  753
```

        <210> 41
```

```
            <211> 341
            <212> DNA
            <213> Homo sapien

            <400> 41
actatatcca tcacaacaga catgcttcat cccatagact tcttgacata gcttcaaatg      60
agtgaaccca tccttgattt atatacatat atgttctcag tattttggga gcctttccac     120
ttctttaaac cttgttcatt atgaacactg aaaataggaa tttgtgaaga gttaaaaagt     180
tatagcttgt ttacgtagta agtttttgaa gtctacattc aatccagaca cttagttgag     240
tgttaaactg tgattttta aaaatatcat ttgagaatat tctttcagag gtattttcat     300
ttttactttt tgattaattg tgttttatat attagggtag t                         341


            <210> 42
            <211> 101
            <212> DNA
            <213> Homo sapien

            <400> 42
acttactgaa tttagttctg tgctcttcct tatttagtgt tgtatcataa atactttgat      60
gtttcaaaca ttctaaataa ataattttca gtggcttcat a                         101


            <210> 43
            <211> 305
            <212> DNA
            <213> Homo sapien

            <400> 43
acatctttgt tacagtctaa gatgtgttct taaatcacca ttccttcctg gtcctcaccc      60
tccagggtgg tctcacactg taattagagc tattgaggag tctttacagc aaattaagat     120
tcagatgcct tgctaagtct agagttctag agttatgttt cagaaagtct aagaaaccca     180
cctcttgaga ggtcagtaaa gaggacttaa tatttcatat ctacaaaatg accacaggat     240
tggatacaga acgagagtta tcctggataa ctcagagctg agtacctgcc ggggggccgc     300
tcgaa                                                                 305


            <210> 44
            <211> 852
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(852)
            <223> n = A,T,C or G

            <400> 44
acataaatat cagagaaaag tagtctttga aatatttacg tccaggagtt ctttgtttct      60
gattatttgg tgtgtgtttt ggtttgtgtc caaagtattg gcagcttcag ttttcatttt     120
ctctccatcc tcgggcattc ttcccaaatt tatataccag tcttcgtcca tccacacgct     180
ccagaatttc tcttttgtag taatatctca tagctcggct gagcttttca taggtcatgc     240
tgctgttgtt cttcttttta ccccatagct gagccactgc ctctgatttc aagaacctga     300
agacgccctc agatcggtct tcccatttta ttaatcctgg gttcttgtct gggttcaaga     360
ggatgtcgcg gatgaattcc cataagtgag tccctctcgg gttgtgcttt ttggtgtggc     420
acttggcagg ggggtcttgc tccttttttca tatcaggtga ctctgcaaca ggaaggtgac     480
tggtggttgt catggagatc tgagcccggc agaaagtttt gctgtccaac aaatctactg     540
tgctaccata gttggtgtca tataaatagt tctngtcttt ccaggtgttc atgatggaag     600
```

```
gctcagtttg ttcagtcttg acaatgacat tgtgtgtgga ctggaacagg tcactactgc      660
actggccgtt ccacttcaga tgctgcaagt tgctgtagag gagntgcccc gccgtccctg      720
ccgcccgggt gaactcctgc aaactcatgc tgcaaaggtg ctcgccgttg atgtcgaact      780
cntggaaagg gatacaattg gcatccagct ggttggtgtc caggaggtga tggagccact      840
cccacacctg gt                                                          852
```

```
        <210> 45
        <211> 234
        <212> DNA
        <213> Homo sapien
```

```
        <400> 45
acaacagacc cttgctcgct aacgacctca tgctcatcaa gttggacgaa tccgtgtccg       60
agtctgacac catccggagc atcagcattg cttcgcagtg ccctaccgcg ggaactctt       120
gcctcgtttc tggctggggt ctgctggcga acggcagaat gcctaccgtg ctgcagtgcg      180
tgaacgtgtc ggtggtgtct gaggaggtct gcagtaagct ctatgacccg ctgt           234
```

```
        <210> 46
        <211> 590
        <212> DNA
        <213> Homo sapien
```

```
        <220>
        <221> misc_feature
        <222> (1)...(590)
        <223> n = A,T,C or G
```

```
        <400> 46
actttttatt taaatgttta taaggcagat ctatgagaat gatagaaaac atggtgtgta       60
atttgatagc aatattttgg agattacaga gttttagtaa ttaccaatta cacagttaaa      120
aagaagataa tatattccaa gcanatacaa aatatctaat gaaagatcaa ggcaggaaaa      180
tgantataac taattgacaa tggaaaatca attttaatgt gaattgcaca ttatccttta      240
aaagctttca aaanaaanaa ttattgcagt ctanttaatt caaacagtgt taaatggtat      300
caggataaan aactgaaggg canaaagaat taattttcac ttcatgtaac ncacccanat      360
ttacaatggc ttaaatgcan ggaaaaagca gtggaagtag ggaagtantc aaggtctttc      420
tggtctctaa tctgccttac tctttgggtg tggctttgat cctctggaga cagctgccag      480
ggctcctgtt atatccacaa tcccagcagc aagatgaagg gatgaaaaag gacacatgct      540
gccttccttt gaggagactt catctcactg gccaacactc agtcacatgt                590
```

```
        <210> 47
        <211> 774
        <212> DNA
        <213> Homo sapien
```

```
        <220>
        <221> misc_feature
        <222> (1)...(774)
        <223> n = A,T,C or G
```

```
        <400> 47
acaaggggggc ataatgaagg agtggggana gattttaaag aaggaaaaaa aacgaggccc       60
tgaacagaat tttcctgnac aacggggctt caaaataatt ttcttgggga ggttcaagac      120
gcttcactgc ttgaaactta aatggatgtg ggacanaatt ttctgtaatg accctgaggg      180
cattacagac gggactctgg gaggaaggat aaacagaaag gggacaaagg ctaatcccaa      240
aacatcaaag aaaggaaggt ggcgtcatac ctcccagcct acacagttct ccagggctct      300
```

```
cctcatccct ggaggacgac agtggaggaa caactgacca tgtccccagg ctcctgtgtg    360
ctggctcctg gtcttcagcc cccagctctg gaagcccacc ctctgctgat cctgcgtggc    420
ccacactcct tgaacacaca tccccaggtt atattcctgg acatggctga acctcctatt    480
cctacttccg agatgccttg ctccctgcag cctgtcaaaa tcccactcac cctccaaacc    540
acggcatggg aagcctttct gacttgcctg attactccag catcttggaa caatccctga    600
ttccccactc cttagaggca agatagggtg gttaagagta gggctggacc acttggagcc    660
aggctgctgg cttcaaattn tggctcattt acgagctatg ggaccttggg caagtnatct    720
tcacttctat gggcntcatt ttgttctacc tgcaaaatgg gggataataa tagt          774
```

        <210> 48
        <211> 124
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(124)
        <223> n = A,T,C or G

        <400> 48

```
canaaattga aattttataa aaaggcattt ttctcttata tccataaaat gatataattt     60
ttgcaantat anaaatgtgt cataaattat aatgttcctt aattacagct caacgcaact    120
tggt                                                                  124
```

        <210> 49
        <211> 147
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(147)
        <223> n = A,T,C or G

        <400> 49

```
gccgatgcta ctattttatt gcaggaggtg ggggtgtttt tattattctc tcaacagctt     60
tgtggctaca ggtggtgtct gactgcatna aaaanttttt tacgggtgat tgcaaaaatt    120
ttagggcacc catatcccaa gcantgt                                        147
```

        <210> 50
        <211> 107
        <212> DNA
        <213> Homo sapien

        <400> 50

```
acattaaatt aataaaagga ctgttggggt tctgctaaaa cacatggctt gatatattgc     60
atggtttgag gttaggagga gttaggcata tgttttggga gaggggt                  107
```

        <210> 51
        <211> 204
        <212> DNA
        <213> Homo sapien

        <400> 51

```
gtcctaggaa gtctagggga cacacgactc tggggtcacg gggccgacac acttgcacgg     60
```

```
cgggaaggaa aggcagagaa gtgacaccgt cagggggaaa tgacagaaag gaaaatcaag        120
gccttgcaag gtcagaaagg ggactcaggg cttccaccac agccctgccc cacttggcca        180
cctccctttt gggaccagca atgt                                               204
```

```
<210> 52
<211> 491
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(491)
<223> n = A,T,C or G

<400> 52
```

```
acaaagataa catttatctt ataacaaaaa tttgatagtt ttaaaggtta gtattgtgta         60
gggtattttc caaaagacta aagagataac tcaggtaaaa agttagaaat gtataaaaca        120
ccatcagaca ggtttttaaa aaacaacata ttacaaaatt agacaatcat ccttaaaaaa        180
aaaacttctt gtatcaattt cttttgttca aaatgactga cttaantatt tttaaatatt        240
tcanaaacac ttcctcaaaa attttcaana tggtagcttt canatgtncc ctcagtccca        300
atgttgctca gataaataaa tctcgtgaga acttaccacc caccacaagc tttctggggc        360
atgcaacagt gtcttttctt tncttttttct tttttttttt ttacaggcac agaaactcat        420
caattttatt tggataacaa agggtctcca aattatattg aaaaataaat ccaagttaat        480
atcactcttg t                                                            491
```

```
<210> 53
<211> 484
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(484)
<223> n = A,T,C or G

<400> 53
```

```
acataattta gcagggctaa ttaccataag atgctatfta ttaanaggtn tatgatctga         60
gtattaacag ttgctgaagt ttggtatttt tatgcagcat tttctttttg ctttgataac        120
actacagaac ccttaaggac actgaaaatt agtaagtaaa gttcagaaac attagctgct        180
caatcaaatc tctacataac actatagtaa ttaaaacgtt aaaaaaaagt gttgaaatct        240
gcactagtat anaccgctcc tgtcaggata anactgcttt ggaacagaaa gggaaaaanc        300
agctttgant ttctttgtgc tgatangagg aaaggctgaa ttaccttgtt gcctctccct        360
aatgattggc aggtcnggta aatnccaaaa catattccaa ctcaacactt cttttccncg        420
tancttgant ctgtgtattc caggancagg cggatggaat gggccagccc ncggatgttc        480
cant                                                                    484
```

```
<210> 54
<211> 151
<212> DNA
<213> Homo sapien

<400> 54
```

```
actaaacctc gtgcttgtga actccataca gaaaacggtg ccatccctga acacggctgg         60
ccactgggta tactgctgac aaccgcaaca acaaaaacac aaatccttgg cactggctag        120
tctatgtcct ctcaagtgcc ttttgtttg t                                       151
```

<210> 55
<211> 91
<212> DNA
<213> Homo sapien

<400> 55
acctggcttg tctccgggtg gttcccggcg ccccccacgg tccccagaac ggacactttc   60
gccctccagt ggatactcga gccaaagtgg t   91

<210> 56
<211> 133
<212> DNA
<213> Homo sapien

<400> 56
ggcggatgtg cgttggttat atacaaatat gtcattttat gtaagggact tgagtatact   60
tggatttttg gtatctgtgg gttgggggga cggtccagga accaataccc catggatacc   120
aagggacaac tgt   133

<210> 57
<211> 147
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(147)
<223> n = A,T,C or G

<400> 57
actctggaga acctgagccg ctgctccgcc tctgggatga ggtgatgcan gcngtggcgc   60
gactgggagc tgagcccttc cctttgcgcc tgcctcagag gattgttgcc gacntgcana   120
tctcantggg ctggatncat gcagggt   147

<210> 58
<211> 198
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(198)
<223> n = A,T,C or G

<400> 58
acagggatat aggtttnaag ttattgtnat tgtaaaatac attgaatttt ctgtatactc   60
tgattacata catttatcct ttaaaaaaga tgtaaatctt aatttttatg ccatctatta   120
atttaccaat gagttacctt gtaaatgaga agtcatgata gcactgaatt ttaactagtt   180
ttgacttcta agtttggt   198

<210> 59
<211> 330
<212> DNA
<213> Homo sapien

```
        <400> 59
acaacaaatg ggttgtgagg aagtcttatc agcaaaactg gtgatggcta ctgaaaagat        60
ccattgaaaa ttatcattaa tgattttaaa tgacaagtta tcaaaaactc actcaatttt        120
cacctgtgct agcttgctaa aatgggagtt aactctagag caaatatagt atcttctgaa        180
tacagtcaat aaatgacaaa gccagggcct acaggtggtt tccagacttt ccagacccag        240
cagaaggaat ctattttatc acatggatct ccgtctgtgc tcaaaatacc taatgatatt        300
tttcgtcttt attggacttc tttgaagagt                                          330


        <210> 60
        <211> 175
        <212> DNA
        <213> Homo sapien


        <400> 60
accgtgggtg ccttctacat tcctgacggc tccttcacca acatctggtt ctacttcggc        60
gtcgtgggct ccttcctctt catcctcatc cagctggtgc tgctcatcga ctttgcgcac        120
tcctggaacc agcggtggct gggcaaggcc gaggagtgcg attcccgtgc ctggt            175


        <210> 61
        <211> 154
        <212> DNA
        <213> Homo sapien


        <400> 61
accccacttt tcctcctgtg agcagtctgg acttctcact gctacatgat gaggctgagt        60
ggttgttgct cttcaacagt atcctcccct ttccggatct gctgagccgg acagcagtgc        120
tggactgcac agccccgggg ctccacattg ctgt                                     154


        <210> 62
        <211> 30
        <212> DNA
        <213> Homo sapien


        <400> 62
cgctcgagcc ctatagtgag tcgtattaga                                          30


        <210> 63
        <211> 89
        <212> DNA
        <213> Homo sapien


        <400> 63
acaagtcatt tcagcaccct ttgctcttca aaactgaoca tcttttatat ttaatgcttc        60
ctgtatgaat aaaaatggtt atgtcaagt                                           89


        <210> 64
        <211> 97
        <212> DNA
        <213> Homo sapien


        <400> 64
accggagtaa ctgagtcggg acgctgaatc tgaatccacc aataaataaa ggttctgcag        60
aatcagtgca tccaggattg gtccttggat ctggggt                                  97
```

```
<210> 65
<211> 377
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(377)
<223> n = A,T,C or G

<400> 65
acaacaanaa ntcccttctt taggccactg atggaaacct ggaaccccct tttgatggca      60
gcatggcgtc ctaggccttg acacagcggc tggggtttgg gctntcccaa accgcacacc     120
ccaaccctgg tctacccaca nttctggcta tgggctgtct ctgccactga acatcaggg      180
tcggtcataa natgaaatcc caanggggac agaggtcagt agaggaagct caatgagaaa     240
ggtgctgttt gctcagccag aaaacagctg cctggcattc gccgctgaac tatgaacccg     300
tgggggtgaa ctacccccan gaggaatcat gcctgggcga tgcaanggtg ccaacaggag     360
gggcgggagg agcatgt                                                    377

<210> 66
<211> 305
<212> DNA
<213> Homo sapien

<400> 66
acgcctttcc ctcagaattc agggaagaga ctgtcgcctg ccttcctccg ttgttgcgtg      60
agaacccgtc tgccccttcc caccatatcc accctcgctc catctttgaa ctcaaacacg     120
aggaactaac tgcaccctgg tcctctcccc agtccccagt tcaccctcca tccctcacct     180
tcctccactc taagggatat caacactgcc cagcacaggg gccctgaatt tatgtggttt     240
ttatatattt tttaataaga tgcactttat gtcatttttt aataaagtct gaagaattac     300
tgttt                                                                 305

<210> 67
<211> 385
<212> DNA
<213> Homo sapien

<400> 67
actacacaca ctccacttgc ccttgtgaga cactttgtcc cagcacttta ggaatgctga      60
ggtcggacca gccacatctc atgtgcaaga ttgcccagca gacatcaggt ctgagagttc     120
cccttttaaa aaaggggact tgcttaaaaa agaagtctag ccacgattgt gtagagcagc     180
tgtgctgtgc tggagattca cttttgagag agttctcctc tgagacctga tctttagagg     240
ctgggcagtc ttgcacatga gatggggctg gtctgatctc agcactcctt agtctgcttg     300
cctctcccag ggccccagcc tggccacacc tgcttacagg gcactctcag atgcccatac     360
catagtttct gtgctagtgg accgt                                           385

<210> 68
<211> 73
<212> DNA
<213> Homo sapien

<400> 68
acttaaccag atatattttt accccagatg gggatattct ttgtaaaaaa tgaaaataaa      60
gtttttttaa tgg                                                         73
```

```
        <210> 69
        <211> 536
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(536)
        <223> n = A,T,C or G

        <400> 69
actagtccag tgtggtggaa ttccattgtg ttgggggctc tcaccctcct ctcctgcagc          60
tccagctttg tgctctgcct ctgaggagac catggcccag catctgagta ccctgctgct        120
cctgctggcc accctagctg tggccctggc ctggagcccc aaggaggagg ataggataat        180
cccgggtggc atctataacg cagacctcaa tgatgagtgg gtacagcgtg cccttcactt        240
cgccatcagc gagtataaca aggccaccaa agatgactac tacagacgtc cgctgcgggt        300
actaagagcc aggcaacaga ccgttggggg ggtgaattac ttcttcgacg tagaggtggg        360
ccgaaccata tgtaccaagt cccagcccaa cttggacacc tgtgccttcc atgaacagcc        420
agaactgcag aagaaacagt tgtgctcttt cgagatctac gaagttccct ggggagaaca        480
gaangtccct gggtgaaatc caggtgtcaa gaaatcctan ggatctgttg ccaggc           536

        <210> 70
        <211> 477
        <212> DNA
        <213> Homo sapien
        <400> 70
atgaccccta acaggggccc tctcagccct cctaatgacc tccggcctac ccatgtgatt          60
tcacttccac tccataacgc tcctcatact aggcctacta accaacacac taaccatata        120
ccaatgatgg cgcgatgtaa cacgagaaag cacataccaa ggccaccaca caccacctgt        180
ccaaaaaggc cttcgatacg ggataatcct atttattacc tcagaagttt ttttcttcgc        240
agggattttt ctgagccttt taccactcca gcctagcccc tacccccaa ctaggagggc        300
actggcccc aacaggcatc acccgctaa atcccctaga agtccactc ctaaacacat        360
ccgtattact cgcatcagga gtatcaatca cctgagctca ccatagtcta atagaaaaca        420
accgaaacca aattattcaa agcactgctt attacaattt tactgggtct ctatttt           477

        <210> 71
        <211> 533
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(533)
        <223> n = A,T,C or G

        <400> 71
agagctatag gtacagtgtg atctcagctt tgcaaacaca ttttctacat agatagtact          60
aggtattaat agatatgtaa agaaagaaat cacaccatta ataatggtaa gattggttta        120
tgtgattttta gtggtatttt tggcacccct atatatgttt tccaaacttt cagcagtgat        180
attatttcca taacttaaaa agtgagtttg aaaaagaaaa tctccagcaa gcatctcatt        240
taaataaagg tttgtcatct ttaaaaatac agcaatatgt gactttttaa aaaagctgtc        300
aaataggtgt gaccctacta ataattatta gaaatacatt taaaaacatc gagtacctca        360
agtcagtttg ccttgaaaaa tatcaaatat aactcttaga gaaatgtaca taaaagaatg        420
cttcgtaatt ttggagtang aggttccctc ctcaattttg tattttaaa aagtacatgg        480
taaaaaaaaa aattcacaac agtatataag gctgtaaaat gaagaattct gcc              533
```

```
<210> 72
<211> 511
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(511)
<223> n = A,T,C or G

<400> 72
tattacggaa aaacacacca cataattcaa ctancaaaga anactgcttc agggcgtgta      60
aaatgaaagg cttccaggca gttatctgat taaagaacac taaaagaggg acaaggctaa     120
aagccgcagg atgtctacac tatancaggc gctatttggg ttggctggag gagctgtgga     180
aaacatggan agattggtgc tgganatcgc cgtggctatt cctcattgtt attacanagt     240
gaggttctct gtgtgcccac tggtttgaaa accgttctnc aataatgata gaatagtaca     300
cacatgagaa ctgaaatggc ccaaacccag aaagaaagcc caactagatc ctcagaanac     360
gcttctaggg acaataaccg atgaagaaaa gatggcctcc ttgtgccccc gtctgttatg     420
atttctctcc attgcagcna naaacccgtt cttctaagca aacncaggtg atgatggcna     480
aaatacaccc cctcttgaag naccnggagg a                                     511
```

```
<210> 73
<211> 499
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(499)
<223> n = A,T,C or G

<400> 73
cagtgccagc actggtgcca gtaccagtac caataacagt gccagtgcca gtgccagcac      60
cagtggtggc ttcagtgctg gtgccagcct gaccgccact ctcacatttg ggctcttcgc     120
tggccttggt ggagctggtg ccagcaccag tggcagctct ggtgcctgtg gtttctccta     180
caagtgagat tttagatatt gttaatcctg ccagtctttc tcttcaagcc agggtgcatc     240
ctcagaaacc tactcaacac agcactctag gcagccacta tcaatcaatt gaagttgaca     300
ctctgcatta aatctatttg ccatttctga aaaaaaaaaa aaaaaaaggg cggccgctcg     360
antctagagg gcccgtttaa acccgctgat cagcctcgac tgtgccttct anttgccagc     420
catctgttgt ttgcccctcc cccgntgcct tccttgaccc tggaaagtgc cactcccact     480
gtcctttcct aantaaaat                                                   499
```

```
<210> 74
<211> 537
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(537)
<223> n = A,T,C or G

<400> 74
tttcatagga gaacacactg aggagatact tgaagaattt ggattcagcc gcgaagagat      60
```

```
ttatcagctt aactcagata aaatcattga aagtaataag gtaaaagcta gtctctaact       120
tccaggccca cggctcaagt gaatttgaat actgcattta cagtgtagag taacacataa       180
cattgtatgc atggaaacat ggaggaacag tattacagtg tcctaccact ctaatcaaga       240
aaagaattac agactctgat tctacagtga tgattgaatt ctaaaaatgg taatcattag       300
ggcttttgat ttataanact ttgggtactt atactaaatt atggtagtta tactgccttc       360
cagtttgctt gatatatttg ttgatattaa gattcttgac ttatattttg aatgggttct       420
actgaaaaan gaatgatata ttcttgaaga catcgatata catttattta cactcttgat       480
tctacaatgt agaaaatgaa ggaaatgccc caaattgtat ggtgataaaa gtcccgt         537
```

        <210> 75
        <211> 467
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(467)
        <223> n = A,T,C or G

        <400> 75
```
caaanacaat tgttcaaaag atgcaaatga tacactactg ctgcagctca caaacacctc        60
tgcatattac acgtacctcc tcctgctcct caagtagtgt ggtctatttt gccatcatca       120
cctgctgtct gcttagaaga acggctttct gctgcaangg agagaaatca taacagacgg       180
tggcacaagg aggccatctt ttcctcatcg gttattgtcc ctagaagcgt cttctgagga       240
tctagttggg ctttctttct gggtttgggc catttcantt ctcatgtctg tactattcta       300
tcattattgt ataacggttt tcaaaccngt gggcacncag agaacctcac tctgtaataa       360
caatgaggaa tagccacggt gatctccagc accaaatctc tccatgttnt tccagagctc       420
ctccagccaa cccaaatagc cgctgctatn gtgtagaaca tccctgn                    467
```

        <210> 76
        <211> 400
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(400)
        <223> n = A,T,C or G

        <400> 76
```
aagctgacag cattcgggcc gagatgtctc gctccgtggc cttagctgtg ctcgcgctac        60
tctctctttc tggcctggag gctatccagc gtactccaaa gattcaggtt tactcacgtc       120
atccagcaga gaatggaaag tcaaatttcc tgaattgcta tgtgtctggg tttcatccat       180
ccgacattga agttgactta ctgaagaatg gagagagaat tgaaaaagtg gagcattcag       240
acttgtcttt cagcaaggac tggtctttct atctcttgta ctacactgaa ttcacccca        300
ctgaaaaaga tgagtatgcc tgccgtgtga accatgtgac tttgtcacag cccaagatng       360
ttnagtggga tcganacatg taagcagcan catgggaggt                             400
```

        <210> 77
        <211> 248
        <212> DNA
        <213> Homo sapien

        <400> 77
```
ctggagtgcc ttggtgtttc aagcccctgc aggaagcaga atgcaccttc tgaggcacct        60
```

```
ccagctgccc cggcgggggа tgcgaggctc ggagcaccct tgcccggctg tgattgctgc      120
caggcactgt tcatctcagc ttttctgtcc ctttgctccc ggcaagcgct tctgctgaaa      180
gttcatatct ggagcctgat gtcttaacga ataaaggtcc catgctccac ccgaaaaaaa      240
aaaaaaaa                                                               248
```

```
        <210> 78
        <211> 201
        <212> DNA
        <213> Homo sapien

        <400> 78
actagtccag tgtggtggaa ttccattgtg ttgggcccaa cacaatggct acctttaaca      60
tcacccagac cccgccctgc ccgtgcccca cgctgctgct aacgacagta tgatgcttac     120
tctgctactc ggaaactatt tttatgtaat taatgtatgc tttcttgttt ataaatgcct     180
gatttaaaaa aaaaaaaaaa a                                               201
```

```
        <210> 79
        <211> 552
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(552)
        <223> n = A,T,C or G

        <400> 79
tccttttgtt aggttttтga gacaacccta gacctaaact gtgtcacaga cttctgaatg      60
tttaggcagt gctagtaatt tcctcgtaat gattctgtta ttactttcct attctttatt     120
cctctttctt ctgaagatta atgaagttga aaattgaggt ggataaatac aaaaaggtag     180
tgtgatagta taagtatcta agtgcagatg aaagtgtgtt atatatatcc attcaaaatt     240
atgcaagtta gtaattactc agggttaact aaattacttt aatatgctgt tgaacctact     300
ctgttccttg gctagaaaaa attataaaca ggactttgtt agtttgggaa gccaaattga     360
taatattcta tgttctaaaa gttgggctat acataaanta tnaagaaata tggaatttta     420
ttcccaggaa tatggggttc atttatgaat antacccggg anagaagttt tgantnaaac     480
cngtttтggt taatacgtta atatgtcctn aatnaacaag gcntgactta tttccaaaaa     540
aaaaaaaaaa aa                                                         552
```

```
        <210> 80
        <211> 476
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(476)
        <223> n = A,T,C or G

        <400> 80
acagggattt gagatgctaa ggccccagag atcgtttgat ccaaccctct tattttcaga      60
ggggaaaatg gggcctagaa gttacagagc atctagctgg tgcgctggca cccctggcct     120
cacacagact cccgagtagc tgggactaca ggcacacagt cactgaagca ggccctgttt     180
gcaattcacg ttgccacctc caacttaaac attcttcata tgtgatgtcc ttagtcacta     240
aggttaaact ttcccaccca gaaaaggcaa cttagataaa atcttagagt actttcatac     300
tcttctaagt cctcttccag cctcactttg agtcctcctt gggggttgat aggaantntc     360
```

```
tcttggctttt ctcaataaaaa tctctatcca tctcatgttt aatttggtac gcntaaaaat    420
gctgaaaaaa ttaaaatgtt ctggtttcnc tttaaaaaaa aaaaaaaaaa aaaaaa         476
```

        <210> 81
        <211> 232
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(232)
        <223> n = A,T,C or G

        <400> 81

```
tttttttttg tatgccntcn ctgtggngtt attgttgctg ccaccctgga ggagcccagt      60
ttcttctgta tctttctttt ctggggatc ttcctggctc tgcccctcca ttcccagcct      120
ctcatcccca tcttgcactt ttgctagggt tggaggcgct ttcctggtag ccccctcagag    180
actcagtcag cgggaataag tcctaggggt gggggtgtgt gcaagccggc ct             232
```

        <210> 82
        <211> 383
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(383)
        <223> n = A,T,C or G

        <400> 82

```
aggcgggagc agaagctaaa gccaaagccc aagaagagtg gcagtgccag cactggtgcc      60
agtaccagta ccaataacat gccagtgcca gtgccagcac cagtggtggc ttcagtgctg     120
gtgccagcct gaccgccact ctcacatttg ggctcttcgc tggccttggt ggagctggtg     180
ccagcaccag tggcagctct ggtgcctgtg gtttctccta caagtgagat tttagatatt     240
gttaatcctg ccagtctttc tcttcaagcc agggtgcatc ctcagaaacc tactcaacac     300
agcactctng gcagccacta tcaatcaatt gaagttgaca ctctgcatta aatctatttg     360
ccatttcaaa aaaaaaaaa aaa                                              383
```

        <210> 83
        <211> 494
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(494)
        <223> n = A,T,C or G

        <400> 83

```
accgaattgg gaccgctggc ttataagcga tcatgtcctc cagtattacc tcaacgagca      60
gggagatcga gtctatacgc tgaagaaatt tgacccgatg ggacaacaga cctgctcagc     120
ccatcctgct cggttctccc cagatgacaa atactctcga caccgaatca ccatcaagaa     180
acgcttcaag gtgctcatga cccagcaacc gcgcccctgtc ctctgagggt ccttaaactg    240
atgtcttttc tgccacctgt tacccctcgg agactccgta accaaactct tcggactgtg     300
agccctgatg cctttttgcc agccatactc tttggcntcc agtctctcgt ggcgattgat     360
```

```
tatgcttgtg tgaggcaatc atggtggcat cacccatnaa gggaacacat ttganttttt        420
tttcncatat tttaaattac naccagaata nttcagaata aatgaattga aaaactctta        480
aaaaaaaaaa aaaa                                                          494
```

        <210> 84
        <211> 380
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(380)
        <223> n = A,T,C or G

        <400> 84
```
gctggtagcc tatggcgtgg ccacggangg gctcctgagg cacgggacag tgacttccca         60
agtatcctgc gccgcgtctt ctaccgtccc tacctgcaga tcttcgggca gattccccag        120
gaggacatgg acgtggccct catggagcac agcaactgct cgtcggagcc cggcttctgg        180
gcacaccctc ctggggccca ggcgggcacc tgcgtctccc agtatgccaa ctggctggtg        240
gtgctgctcc tcgtcatctt cctgctcgtg gccaacatcc tgctggtcac ttgctcattg        300
ccatgttcag ttacacattc ggcaaagtac agggcaacag cnatctctac tgggaaggcc        360
agcgttnccg cctcatccgg                                                    380
```

        <210> 85
        <211> 481
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(481)
        <223> n = A,T,C or G

        <400> 85
```
gagttagctc ctccacaacc ttgatgaggt cgtctgcagt ggcctctcgc ttcataccgc         60
tnccatcgtc atactgtagg tttgccacca cctcctgcat cttggggcgg ctaatatcca        120
ggaaactctc aatcaagtca ccgtcnatna aacctgtggc tggttctgtc ttccgctcgg        180
tgtgaaagga tctccagaag gagtgctcga tcttccccac acttttgatg actttattga        240
gtcgattctg catgtccagc aggaggttgt accagctctc tgacagtgag gtcaccagcc        300
ctatcatgcc nttgaacgtg ccgaagaaca ccgagccttg tgtggggggt gnagtctcac        360
ccagattctg cattaccaga nagccgtggc aaaaganatt gacaactcgc ccaggnngaa        420
aaagaacacc tcctggaagt gctngccgct cctcgtccnt tggtggnngc gcntnccttt        480
t                                                                        481
```

        <210> 86
        <211> 472
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(472)
        <223> n = A,T,C or G

        <400> 86

```
aacatcttcc tgtataatgc tgtgtaatat cgatccgatn ttgtctgctg agaattcatt      60
acttggaaaa gcaacttnaa gcctggacac tggtattaaa attcacaata tgcaacactt     120
taaacagtgt gtcaatctgc tcccttactt tgtcatcacc agtctgggaa taagggtatg     180
ccctattcac acctgttaaa agggcgctaa gcatttttga ttcaacatct tttttttttga    240
cacaagtccg aaaaaagcaa aagtaaacag ttnttaattt gttagccaat tcactttctt     300
catgggacag agccatttga tttaaaaagc aaattgcata atattgagct ttgggagctg     360
atatntgagc ggaagantag cctttctact tcaccagaca caactccttt catattggga     420
tgttnacnaa agttatgtct cttacagatg ggatgctttt gtggcaattc tg             472
```

```
        <210> 87
        <211> 413
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(413)
        <223> n = A,T,C or G


        <400> 87
agaaaccagt atctctnaaa acaacctctc ataccttgtg gacctaattt tgtgtgcgtg      60
tgtgtgtgcg cgcatattat atagacaggc acatcttttt tactttgta aaagcttatg     120
cctctttggt atctatatct gtgaaagttt taatgatctg ccataatgtc ttggggacct     180
ttgtcttctg tgtaaatggt actagagaaa acacctatnt tatgagtcaa tctagttngt     240
tttattcgac atgaaggaaa tttccagatn acaacactna caaactctcc cttgactagg     300
ggggacaaag aaaagcanaa ctgaacatna gaaacaattn cctggtgaga aattncataa     360
acagaaattg ggtngtatat tgaaananng catcattnaa acgttttttt ttt            413
```

```
        <210> 88
        <211> 448
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(448)
        <223> n = A,T,C or G


        <400> 88
cgcagcgggt cctctctatc tagctccagc ctctcgcctg ccccactccc cgcgtccgc       60
gtcctagccn accatggccg ggcccctgcg cgccccgctg ctcctgctgg ccatcctggc     120
cgtggccctg gccgtgagcc ccgcggccgg ctccagtccc ggcaagccgc cgcgcctggt     180
gggaggccca tggacccgc gtggaagaag aaggtgtgcg gcgtgcactg gactttgccg     240
tcggcnanta caacaaaccc gcaacnactt ttaccnagcn cgcgctgcag gttgtgccgc     300
cccaancaaa ttgttactng gggtaantaa ttcttggaag ttgaacctgg gccaaacnng    360
tttaccagaa ccnagccaat tngaacaatt nccctccat aacagcccct tttaaaaagg     420
gaancantcc tgntctttc caaatttt                                         448
```

```
        <210> 89
        <211> 463
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
```

34

```
        <222> (1)...(463)
        <223> n = A,T,C or G

        <400> 89
gaattttgtg cactggccac tgtgatggaa ccattgggcc aggatgcttt gagtttatca    60
gtagtgattc tgccaaagtt ggtgttgtaa catgagtatg taaaatgtca aaaaattagc   120
agaggtctag gtctgcatat cagcagacag tttgtccgtg tattttgtag ccttgaagtt   180
ctcagtgaca agttnnttct gatgcgaagt tctnattcca gtgttttagt cctttgcatc   240
tttnatgttn agacttgcct ctntnaaatt gcttttgtnt tctgcaggta ctatctgtgg   300
tttaacaaaa tagaannact tctctgcttn gaanatttga atatcttaca tctnaaaatn   360
aattctctcc ccatannaaa acccangccc ttgggganaat ttgaaaaang gntccttcnn   420
aattcnnana anttcagntn tcatacaaca naacngganc ccc                     463

        <210> 90
        <211> 400
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(400)
        <223> n = A,T,C or G

        <400> 90
agggattgaa ggtctnttnt actgtcggac tgttcancca ccaactctac aagttgctgt    60
cttccactca ctgtctgtaa gcntnttaac ccagactgta tcttcataaa tagaacaaat   120
tcttcaccag tcacatcttc taggaccttt ttggattcag ttagtataag ctcttccact   180
tcctttgtta agacttcatc tggtaaagtc ttaagttttg tagaaaggaa tttaattgct   240
cgttctctaa caatgtcctc tccttgaagt atttggctga acaacccacc tnaagtccct   300
ttgtgcatcc attttaaata tacttaatag ggcattggtn cactaggtta aattctgcaa   360
gagtcatctg tctgcaaaag ttgcgttagt atatctgcca                        400

        <210> 91
        <211> 480
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(480)
        <223> n = A,T,C or G

        <400> 91
gagctcggat ccaataatct ttgtctgagg gcagcacaca tatncagtgc catggnaact    60
ggtctacccc acatgggagc agcatgccgt agntatataa ggtcattccc tgagtcagac   120
atgcctcttt gactaccgtg tgccagtgct ggtgattctc acacacctcc nnccgctctt   180
tgtggaaaaa ctggcacttg nctggaacta gcaagacatc acttacaaat tcacccacga   240
gacacttgaa aggtgtaaca aagcgactct tgcattgctt tttgtccctc cggcaccagt   300
tgtcaatact aacccgctgg tttgcctcca tcacatttgt gatctgtagc tctggataca   360
tctcctgaca gtactgaaga acttcttctt ttgtttcaaa agcaactctt ggtgcctgtt   420
ngatcaggtt cccatttccc agtccgaatg ttcacatggc atatnttact tcccacaaaa   480

        <210> 92
        <211> 477
        <212> DNA
```

<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(477)
<223> n = A,T,C or G

<400> 92
```
atacagccca natcccacca cgaagatgcg cttgttgact gagaacctga tgcggtcact       60
ggtcccgctg tagccccagc gactctccac ctgctggaag cggttgatgc tgcactcctt      120
cccacgcagg cagcagcggg gccggtcaat gaactccact cgtggcttgg ggttgacggt      180
taantgcagg aagaggctga ccacctcgcg gtccaccagg atgcccgact gtgcgggacc      240
tgcagcgaaa ctcctcgatg gtcatgagcg ggaagcgaat gangcccagg gccttgccca      300
gaaccttccg cctgttctct ggcgtcacct gcagctgctg ccgctacac tcggcctcgg      360
accagcggac aaacggcgtt gaacagccgc acctcacgga tgcccantgt gtcgcgctcc      420
aggaacggcn ccagcgtgtc caggtcaatg tcggtgaanc ctccgcgggt aatggcg        477
```

<210> 93
<211> 377
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(377)
<223> n = A,T,C or G

<400> 93
```
gaacggctgg accttgcctc gcattgtgct gctggcagga ataccttggc aagcagctcc       60
agtccgagca gccccagacc gctgccgccc gaagctaagc ctgcctctgg ccttcccctc      120
cgcctcaatg cagaaccant agtgggagca ctgtgtttag agttaagagt gaacactgtn      180
tgattttact tgggaatttc ctctgttata tagcttcttcc caatgctaat ttccaaacaa      240
caacaacaaa ataacatgtt tgcctgttna gttgtataaa agtangtgat tctgtatnta      300
aagaaaatat tactgttaca tatactgctt gcaanttctg tatttattgg tnctctggaa      360
ataaatatat tattaaa                                                      377
```

<210> 94
<211> 495
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(495)
<223> n = A,T,C or G

<400> 94
```
ccctttgagg ggttagggtc cagttcccag tggaagaaac aggccaggag aantgcgtgc       60
cgagctgang cagatttccc acagtgaccc cagagccctg ggctatagtc tctgaccct       120
ccaaggaaag accaccttct ggggacatgg gctggagggc aggacctaga ggcaccaagg      180
gaaggcccca ttccgggggct gttccccgag gaggaaggga aggggctctg tgtgcccccc      240
acgaggaana ggccctgant cctgggatca nacaccccctt cacgtgtatc cccacacaaa      300
tgcaagctca ccaaggtccc ctctcagtcc cttccctaca ccctgaacgg ncactggccc      360
acacccaccc agancancca cccgccatgg ggaatgtnct caaggaatcg cnggcaacg       420
tggactctng tcccnnaagg gggcagaatc tccaatagan gganngaacc cttgctnana      480
```

```
aaaaaaaana aaaaa                                                   495

        <210> 95
        <211> 472
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(472)
        <223> n = A,T,C or G

        <400> 95
ggttacttgg tttcattgcc accacttagt ggatgtcatt tagaaccatt ttgtctgctc    60
cctctggaag ccttgcgcag agcggacttt gtaattgttg gagaataact gctgaatttt   120
tagctgtttt gagttgattc gcaccactgc accacaactc aatatgaaaa ctatttnact   180
tatttattat cttgtgaaaa gtatacaatg aaaattttgt tcatactgta tttatcaagt   240
atgatgaaaa gcaatagata tatattcttt tattatgttn aattatgatt gccattatta   300
atcggcaaaa tgtggagtgt atgttctttt cacagtaata tatgcctttt gtaacttcac   360
ttggttattt tattgtaaat gaattacaaa attcttaatt taagaaaatg gtangttata   420
tttanttcan taatttcttt ccttgtttac gttaattttg aaaagaatgc at           472

        <210> 96
        <211> 476
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(476)
        <223> n = A,T,C or G

        <400> 96
ctgaagcatt tcttcaaact tntctacttt tgtcattgat acctgtagta agttgacaat    60
gtggtgaaat ttcaaaatta tatgtaactt ctactagttt tactttctcc cccaagtctt   120
ttttaactca tgattttttac acacacaatc cagaacttat tatatagcct ctaagtcttt   180
attcttcaca gtagatgatg aaagagtcct ccagtgtctt gngcanaatg ttctagntat   240
agctggatac atacngtggg agttctataa actcatacct cagtgggact naaccaaaat   300
tgtgttagtc tcaattccta ccacactgag ggagcctccc aaatcactat attcttatct   360
gcaggtactc ctccagaaaa acngacaggg caggcttgca tgaaaaagtn acatctgcgt   420
tacaaagtct atcttcctca nangtctgtn aaggaacaat ttaatcttct agcttt       476

        <210> 97
        <211> 479
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(479)
        <223> n = A,T,C or G

        <400> 97
actctttcta atgctgatat gatcttgagt ataagaatgc atatgtcact agaatggata    60
aaataatgct gcaaacttaa tgttcttatg caaaatggaa cgctaatgaa acacagctta   120
```

```
caatcgcaaa tcaaaactca caagtgctca tctgttgtag atttagtgta ataagactta     180
gattgtgctc cttcggatat gattgtttct canatcttgg gcaatnttcc ttagtcaaat     240
caggctacta gaattctgtt attggatatn tgagagcatg aaatttttaa naatacactt     300
gtgattatna aattaatcac aaatttcact tatacctgct atcagcagct agaaaaacat     360
ntnnttttta natcaaagta ttttgtgttt ggaantgtnn aaatgaaatc tgaatgtggg     420
ttcnatctta tttttcccn gacnactant tncttttta gggnctattc tganccatc      479
```

        <210> 98
        <211> 461
        <212> DNA
        <213> Homo sapien

        <400> 98
```
agtgacttgt cctccaacaa aaccccttga tcaagtttgt ggcactgaca atcagaccta      60
tgctagttcc tgtcatctat tcgctactaa atgcagactg gaggggacca aaaaggggca     120
tcaactccag ctggattatt ttggagcctg caaatctatt cctacttgta cggactttga     180
agtgattcag tttcctctac ggatgagaga ctggctcaag aatatcctca tgcagcttta     240
tgaagccact ctgaacacgc tggttatcta gatgagaaca gagaaataaa gtcagaaaat     300
ttacctggag aaaagaggct ttggctgggg accatcccat tgaaccttct cttaaggact     360
ttaagaaaaa ctaccacatg ttgtgtatcc tggtgccggc cgtttatgaa ctgaccaccc     420
tttggaataa tcttgacgct cctgaacttg ctcctctgcg a                        461
```

        <210> 99
        <211> 171
        <212> DNA
        <213> Homo sapien

        <400> 99
```
gtggccgcgc gcaggtgttt cctcgtaccg cagggccccc tcccttcccc aggcgtccct      60
cggcgcctct gcgggcccga ggaggagcgg ctggcgggtg ggggagtgt gacccaccct     120
cggtgagaaa agccttctct agcgatctga gaggcgtgcc ttgggggtac c             171
```

        <210> 100
        <211> 269
        <212> DNA
        <213> Homo sapien

        <400> 100
```
cggccgcaag tgcaactcca gctggggccg tgcggacgaa gattctgcca gcagttggtc      60
cgactgcgac gacggcggcg gcgacagtcg caggtgcagc gcgggcgcct ggggtcttgc     120
aaggctgagc tgacgccgca gaggtcgtgt cacgtcccac gaccttgacg ccgtcgggga     180
cagccggaac agagcccggt gaagcgggag gcctcgggga gccctcgggg aagggcggcc     240
cgagagatac gcaggtgcag gtggccgcc                                      269
```

        <210> 101
        <211> 405
        <212> DNA
        <213> Homo sapien

        <400> 101
```
ttttttttttt tttggaatc tactgcgagc acagcaggtc agcaacaagt ttattttgca      60
gctagcaagg taacagggta gggcatggtt acatgttcag gtcaacttcc tttgtcgtgg     120
ttgattggtt tgtctttatg ggggcggggt ggggtagggg aaacgaagca aataacatgg     180
agtgggtgca ccctccctgt agaacctggt tacaaagctt ggggcagttc acctggtctg     240
tgaccgtcat tttcttgaca tcaatgttat tagaagtcag gatatctttt agagagtcca     300
```

```
ctgttctgga gggagattag ggtttcttgc caaatccaac aaaatccact gaaaaagttg      360
gatgatcagt acgaataccg aggcatattc tcatatcggt ggcca                      405
```

```
        <210> 102
        <211> 470
        <212> DNA
        <213> Homo sapien


        <400> 102
tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt      60
ggcacttaat ccattttttat ttcaaaatgt ctacaaattt aatcccatta tacggtattt     120
tcaaaatcta aattattcaa attagccaaa tccttaccaa ataataccca aaaatcaaaa      180
atatacttct ttcagcaaac ttgttacata aattaaaaaa atatatacgg ctggtgtttt      240
caaagtacaa ttatcttaac actgcaaaca ttttaaggaa ctaaaataaa aaaaaacact      300
ccgcaaaggt taaagggaac aacaaattct tttacaacac cattataaaa atcatatctc      360
aaatcttagg ggaatatata cttcacacgg gatcttaact tttactcact ttgtttattt      420
ttttaaacca ttgtttgggc ccaacacaat ggaatccccc ctggactagt                 470
```

```
        <210> 103
        <211> 581
        <212> DNA
        <213> Homo sapien


        <400> 103
tttttttttt tttttttttga cccccctctt ataaaaaaca agttaccatt ttattttact    60
tacacatatt tattttataa ttggtattag atattcaaaa ggcagctttt aaaatcaaac     120
taaatggaaa ctgccttaga tacataattc ttaggaatta gcttaaaatc tgcctaaagt     180
gaaaatcttc tctagctctt ttgactgtaa attttttgact cttgtaaaac atccaaattc    240
atttttcttg tctttaaaat tatctaatct ttccattttt tccctattcc aagtcaattt     300
gcttctctag cctcatttcc tagctcttat ctactattag taagtggctt ttttcctaaa     360
agggaaaaca ggaagagaaa tggcacacaa aacaaacatt ttatattcat atttctacct     420
acgttaataa aatagcattt tgtgaagcca gctcaaaaga aggcttagat ccttttatgt      480
ccattttagt cactaaacga tatcaaagtg ccagaatgca aaaggtttgt gaacatttat      540
tcaaaagcta atataagata tttcacatac tcatctttct g                        581
```

```
        <210> 104
        <211> 578
        <212> DNA
        <213> Homo sapien


        <400> 104
tttttttttt tttttttttt ttttctcttc ctttttttttt gaaatgagga tcgagttttt    60
cactctctag atagggcatg aagaaaactc atctttccag cttttaaaata acaatcaaat    120
ctcttatgct atatcatatt ttaagttaaa ctaatgagtc actggcttat cttctcctga     180
aggaaatctg ttcattcttc tcattcatat agttatatca agtactacct tgcatattga     240
gaggtttttc ttctctattt acacatatat ttccatgtga atttgtatca aacctttatt     300
ttcatgcaaa ctagaaaata atgtttcttt tgcataagag aagagaacaa tatagcatta    360
caaaactgct caaattgttt gttaagttat ccattataat tagttggcag gagctaatac    420
aaatcacatt tacgacagca ataataaaac tgaagtacca gttaaatatc caaaataatt    480
aaaggaacat ttttagcctg ggtataatta gctaattcac tttacaagca tttattagaa    540
tgaattcaca tgttattatt cctagcccaa cacaatgg                            578
```

```
        <210> 105
        <211> 538
        <212> DNA
```

```
          <213> Homo sapien

          <400> 105
tttttttttt ttttcagta ataatcagaa caatatttat ttttatattt aaaattcata       60
gaaaagtgcc ttacatttaa taaaagtttg tttctcaaag tgatcagagg aattagatat      120
gtcttgaaca ccaatattaa tttgaggaaa atacaccaaa atacattaag taaattattt      180
aagatcatag agcttgtaag tgaaaagata aaatttgacc tcagaaactc tgagcattaa      240
aaatccacta ttagcaaata aattactatg gacttcttgc tttaattttg tgatgaatat      300
ggggtgtcac tggtaaacca acacattctg aaggatacat tacttagtga tagattctta      360
tgtactttgc taatacgtgg atatgagttg acaagtttct cttttcttcaa tcttttaagg      420
ggcgagaaat gaggaagaaa agaaaaggat tacgcatact gttctttcta tggaaggatt      480
agatatgttt cctttgccaa tattaaaaaa ataataatgt ttactactag tgaaaccc       538

          <210> 106
          <211> 473
          <212> DNA
          <213> Homo sapien

          <400> 106
tttttttttt tttttagtc aagtttctat ttttattata attaaagtct tggtcatttc       60
atttattagc tctgcaactt acatatttaa attaaagaaa cgttttagac aactgtacaa      120
tttataaatg taaggtgcca ttattgagta atatattcct ccaagagtgg atgtgtccct      180
tctcccacca actaatgaac agcaacatta gtttaatttt attagtagat atacactgct      240
gcaaacgcta attctcttct ccatccccat gtgatattgt gtatatgtgt gagttggtag      300
aatgcatcac aatctacaat caacagcaag atgaagctag gctggctttt cggtgaaaat      360
agactgtgtc tgtctgaatc aaatgatctg acctatcctc ggtggcaaga actcttcgaa      420
ccgcttcctc aaaggcgctg ccacatttgt ggctctttgc acttgtttca aaa            473

          <210> 107
          <211> 1621
          <212> DNA
          <213> Homo sapien

          <400> 107
cgccatggca ctgcagggca tctcggtcat ggagctgtcc ggcctggccc cgggccccgtt       60
ctgtgctatg gtcctggctg acttcggggc gcgtgtggta cgcgtggacc ggcccggctc      120
ccgctacgac gtgagccgct tgggccgggg caagcgctcg ctagtgctgg acctgaagca      180
gccgcgggga gccgccgtgc tgcggcgtct gtgcaagcgg tcggatgtgc tgctggagcc      240
cttccgccgc ggtgtcatgg agaaactcca gctgggccca gagattctgc agcgggaaaa      300
tccaaggctt atttatgcca ggctgagtgg atttggccag tcaggaagct tctgccggtt      360
agctggccac gatatcaact atttggcttt gtcaggtgtt ctctcaaaaa ttggcagaag      420
tggtgagaat ccgtatgccc cgctgaatct cctggctgac tttgctggtg gtggccttat      480
gtgtgcactg ggcattataa tggctctttt tgaccgcaca cgcactgaca agggtcaggt      540
cattgatgca aatatggtgg aaggaacagc atatttaagt tctttttctgt ggaaaactca      600
gaaatcgagt ctgtgggaag cacctcgagg acagaacatg ttggatggtg gagcaccttt      660
ctatacgact tacaggacag cagatgggga attcatggct gttggagcaa tagaaccoca      720
gttctacgag ctgctgatca aaggacttgg actaaagtct gatgaacttc ccaatcagat      780
gagcatggat gattggccag aaatgaagaa gaagtttgca gatgtatttg caaagaagac      840
gaaggcagag tggtgtcaaa tctttgacgg cacagatgcc tgtgtgactc cggttctgac      900
ttttgaggag gttgttcatc atgatcacaa caaggaacgg ggctcgttta tcaocagtga      960
ggagcaggac gtgagccccc gccctgcacc tctgctgtta aacacoccag ccatcccttc     1020
tttcaaaagg gatcctttca taggagaaca cactgaggag atacttgaag aatttggatt     1080
cagccgcgaa gagatttatc agcttaactc agataaaatc attgaaagta ataaggtaaa     1140
agctagtctc taacttccag gcccacggct caagtgaatt tgaatactgc atttacagtg     1200
tagagtaaca cataacattg tatgcatgga aacatggagg aacagtatta cagtgtccta     1260
```

```
ccactctaat caagaaaaga attacagact ctgattctac agtgatgatt gaattctaaa      1320
aatggttatc attagggctt ttgatttata aaactttggg tactatact aaattatggt       1380
agttattctg ccttccagtt tgcttgatat atttgttgat attaagattc ttgacttata       1440
ttttgaatgg gttctagtga aaaaggaatg atatattctt gaagacatcg atatacattt       1500
atttacactc ttgattctac aatgtagaaa atgaggaaat gccacaaatt gtatggtgat       1560
aaaagtcacg tgaaacaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa       1620
a                                                                        1621
```

```
        <210> 108
        <211> 382
        <212> PRT
        <213> Homo sapien


        <400> 108
Met Ala Leu Gln Gly Ile Ser Val Met Glu Leu Ser Gly Leu Ala Pro
 1               5                  10                  15
Gly Pro Phe Cys Ala Met Val Leu Ala Asp Phe Gly Ala Arg Val Val
            20                  25                  30
Arg Val Asp Arg Pro Gly Ser Arg Tyr Asp Val Ser Arg Leu Gly Arg
        35                  40                  45
Gly Lys Arg Ser Leu Val Leu Asp Leu Lys Gln Pro Arg Gly Ala Ala
    50                  55                  60
Val Leu Arg Arg Leu Cys Lys Arg Ser Asp Val Leu Leu Glu Pro Phe
65                  70                  75                  80
Arg Arg Gly Val Met Glu Lys Leu Gln Leu Gly Pro Glu Ile Leu Gln
                85                  90                  95
Arg Glu Asn Pro Arg Leu Ile Tyr Ala Arg Leu Ser Gly Phe Gly Gln
            100                 105                 110
Ser Gly Ser Phe Cys Arg Leu Ala Gly His Asp Ile Asn Tyr Leu Ala
            115                 120                 125
Leu Ser Gly Val Leu Ser Lys Ile Gly Arg Ser Gly Glu Asn Pro Tyr
    130                 135                 140
Ala Pro Leu Asn Leu Leu Ala Asp Phe Ala Gly Gly Gly Leu Met Cys
145                 150                 155                 160
Ala Leu Gly Ile Ile Met Ala Leu Phe Asp Arg Thr Arg Thr Asp Lys
                165                 170                 175
Gly Gln Val Ile Asp Ala Asn Met Val Glu Gly Thr Ala Tyr Leu Ser
                180                 185                 190
Ser Phe Leu Trp Lys Thr Gln Lys Ser Ser Leu Trp Glu Ala Pro Arg
            195                 200                 205
Gly Gln Asn Met Leu Asp Gly Gly Ala Pro Phe Tyr Thr Thr Tyr Arg
    210                 215                 220
Thr Ala Asp Gly Glu Phe Met Ala Val Gly Ala Ile Glu Pro Gln Phe
225                 230                 235                 240
Tyr Glu Leu Leu Ile Lys Gly Leu Gly Leu Lys Ser Asp Glu Leu Pro
                245                 250                 255
Asn Gln Met Ser Met Asp Asp Trp Pro Glu Met Lys Lys Lys Phe Ala
            260                 265                 270
Asp Val Phe Ala Lys Lys Thr Lys Ala Glu Trp Cys Gln Ile Phe Asp
        275                 280                 285
Gly Thr Asp Ala Cys Val Thr Pro Val Leu Thr Phe Glu Glu Val Val
    290                 295                 300
His His Asp His Asn Lys Glu Arg Gly Ser Phe Ile Thr Ser Glu Glu
305                 310                 315                 320
Gln Asp Val Ser Pro Arg Pro Ala Pro Leu Leu Leu Asn Thr Pro Ala
```

```
                 325                   330                   335
Ile Pro Ser Phe Lys Arg Asp Pro Phe Ile Gly Glu His Thr Glu Glu
                 340                   345                   350
Ile Leu Glu Glu Phe Gly Phe Ser Arg Glu Glu Ile Tyr Gln Leu Asn
             355                   360                   365
Ser Asp Lys Ile Ile Glu Ser Asn Lys Val Lys Ala Ser Leu
         370                   375                   380
```

```
<210> 109
<211> 1524
<212> DNA
<213> Homo sapien

<400> 109
ggcacgaggc tgcgccaggg cctgagcgga ggcggggggca gcctcgccag cgggggcccc     60
gggcctggcc atgcctcact gagccagcgc ctgcgcctct acctcgccga cagctggaac    120
cagtgcgacc tagtggctct cacctgcttc ctcctgggcg tgggctgccg gctgaccccg    180
ggtttgtacc acctgggccg cactgtcctc tgcatcgact tcatggtttt cacggtgcgg    240
ctgcttcaca tcttcacggt caacaaacag ctggggccca agatcgtcat cgtgagcaag    300
atgatgaagg acgtgttctt cttcctcttc ttcctcggcg tgtggctggt agcctatggc    360
gtggccacgg aggggctcct gaggccacgg gacagtgact tcccaagtat cctgcgccgc    420
gtcttctacc gtccctacct gcagatcttc gggcagattc cccaggagga catggacgtg    480
gccctcatgg agcacagcaa ctgctcgtcg gagcccggct tctgggcaca ccctcctggg    540
gcccaggcgg gcacctgcgt ctcccagtat gccaactggc tggtggtgct gctcctcgtc    600
atcttcctgc tcgtggccaa catcctgctg gtcaacttgc tcattgccat gttcagttac    660
acattcggca aagtacaggg caacagcgat ctctactgga aggcgcagcg ttaccgcctc    720
atccgggaat tccactctcg gcccgcgctg gccccgcccct ttatcgtcat ctcccacttg    780
cgcctcctgc tcaggcaatt gtgcaggcga ccccggagcc cccagccgtc ctccccggcc    840
ctcgagcatt tccgggttta cctttctaag gaagccgagc ggaagctgct aacgtgggaa    900
tcggtgcata aggagaactt tctgctggca cgcgctaggg acaagcggga gagcgactcc    960
gagcgtctga agcgcacgtc ccagaaggtg gacttggcac tgaaacagct gggacacatc   1020
cgcgagtacg aacagcgcct gaaagtgctg gagcgggagg tccagcagtg tagccgcgtc   1080
ctggggtggg tggccgaggc cctgagccgc tctgccttgc tgcccccagg tgggccgcca   1140
cccccctgacc tgcctgggtc caaagactga gccctgctgg cggacttcaa ggagaagccc   1200
ccacagggga tttgctcct agagtaaggc tcatctgggc ctcggccccc gcacctggtg   1260
gccttgtcct tgaggtgagc cccatgtcca tctgggccac tgtcaggacc accttttggga   1320
gtgtcatcct tacaaaccac agcatgcccg gctcctccca gaaccagtcc cagcctggga   1380
ggatcaaggc ctggatcccg ggccgttatc catctggagg ctgcagggtc cttggggtaa   1440
cagggaccac agaccccctca ccactcacag attcctcaca ctgggaaat aaagccattt   1500
cagaggaaaa aaaaaaaaaa aaaa                                         1524
```

```
<210> 110
<211> 3410
<212> DNA
<213> Homo sapien

<400> 110
gggaaccagc ctgcacgcgc tggctccggg tgacagccgc gcgcctcggc caggatctga     60
gtgatgagac gtgtccccac tgaggtgccc cacagcagca ggtgttgagc atgggctgag    120
aagctggacc ggcaccaaag ggctggcaga aatgggcgcc tggctgattc ctaggcagtt    180
ggcggcagca aggaggagag gccgcagctt ctggagcaga gccgagacga gcagttctg    240
gagtgcctga acggccccct gagccctacc cgcctggccc actatggtcc agaggctgtg    300
ggtgagccgc ctgctgcggc accggaaagc ccagctcttg ctggtcaacc tgctaacctt    360
tggcctggag gtgtgtttgg ccgcaggcat cacctatgtg ccgcctctgc tgctggaagt    420
gggggtagag gagaagttca tgaccatggt gctgggcatt ggtccagtgc tgggcctggt    480
```

```
ctgtgtcccg ctcctaggct cagccagtga ccactggcgt ggacgctatg gccgccgccg    540
gcccttcatc tgggcactgt ccttgggcat cctgctgagc ctctttctca tcccaagggc    600
cggctggcta gcagggctgc tgtgcccgga tcccaggccc ctggagctgg cactgctcat    660
cctgggcgtg gggctgctgg acttctgtgg ccaggtgtgc ttcactccac tggaggccct    720
gctctctgac ctcttccggg acccggacca ctgtcgccag gcctactctg tctatgcctt    780
catgatcagt cttgggggct gcctgggcta cctcctgcct gccattgact gggacaccag    840
tgccctggcc ccctacctgg gcacccagga ggagtgcctc tttggcctgc tcaccctcat    900
cttcctcacc tgcgtagcag ccacactgct ggtggctgag gaggcagcgc tgggccccac    960
cgagccagca gaagggctgt cggccccctc cttgtcgccc cactgctgtc catgccgggc   1020
ccgcttggct ttccggaacc tgggcgccct gcttccccgg ctgcaccagc tgtgctgccg   1080
catgccccgc accctgcgcc ggctcttcgt ggctgagctg tgcagctgga tggcactcat   1140
gaccttcacg ctgtttttaca cggatttcgt gggcgagggg ctgtaccagg gcgtgcccag   1200
agctgagccg ggcaccgagg cccggagaca ctatgatgaa ggcgttcgga tgggcagcct   1260
ggggctgttc ctgcagtgcg ccatctccct ggtcttctct ctggtcatgg accggctggt   1320
gcagcgattc ggcactcgag cagtctattt ggccagtgtg gcagctttcc ctgtggctgc   1380
cggtgccaca tgcctgtccc acagtgtggc cgtggtgaca gcttcagccg ccctcaccgg   1440
gttcaccttc tcagccctgc agatcctgcc ctacacactg gcctccctct accaccggga   1500
gaagcaggtg ttcctgccca aataccgagg ggacactgga ggtgctagca gtgaggacag   1560
cctgatgacc agcttcctgc caggccctaa gcctggagct cccttcccta atggacacgt   1620
gggtgctgga ggcagtggcc tgctcccacc tccacccgcg ctctgcgggg cctctgcctg   1680
tgatgtctcc gtacgtgtgg tggtgggtga gcccaccgag gccagggtgg ttccgggccg   1740
gggcatctgc ctggacctcg ccatcctgga tagtgccttc ctgctgtccc aggtggcccc   1800
atccctgttt atgggctcca ttgtccagct cagccagtct gtcactgcct atatggtgtc   1860
tgccgcaggc ctgggtctgg tcgccattta ctttgctaca caggtagtat ttgacaagag   1920
cgacttggcc aaatactcag cgtagaaaac ttccagcaca ttggggtgga gggcctgcct   1980
cactgggtcc cagctccccg ctcctgttag ccccatgggg ctgccgggct ggccgccagt   2040
ttctgttgct gccaaagtaa tgtggctctc tgctgccacc ctgtgctgct gaggtgcgta   2100
gctgcacagc tgggggctgg ggcgtccctc tcctctctcc ccagtctcta gggctgcctg   2160
actggaggcc ttccaagggg gtttcagtct ggacttatac agcgaggcca gaagggctcc   2220
atgcactgga atgcggggac tctgcaggtg gattacccag gctcagggtt aacagctagc   2280
ctcctagttg agacacacct agagaagggt ttttgggagc tgaataaact cagtcacctg   2340
gtttcccatc tctaagcccc ttaacctgca gcttcgttta atgtagctct tgcatgggag   2400
tttctaggat gaaacactcc tccatgggat ttgaacatat gacttatttg taggggaaga   2460
gtcctgaggg gcaacacaca agaaccaggt cccctcagcc cacagcactg tcttttttgct   2520
gatccacccc cctcttacct tttatcagga tgtggcctgt tggtccttct gttgccatca   2580
cagagacaca ggcatttaaa tatttaactt atttatttaa caaagtagaa gggaatccat   2640
tgctagcttt tctgtgttgg tgtctaatat ttgggtaggg tggggggatcc ccaacaatca   2700
ggtcccctga gatagctggt cattgggctg atcattgcca gaatcttctt ctcctggggt   2760
ctggcccccc aaaatgccta acccaggacc ttggaaattc tactcatccc aaatgataat   2820
tccaaatgct gttacccaag gttagggtgt tgaaggaagg tagagggtgg ggcttcaggt   2880
ctcaacggct tccctaacca ccccctcttct cttggcccag cctggttccc cccacttcca   2940
ctcccctcta ctctctctag gactgggctg atgaaggcac tgcccaaaat ttcccctacc   3000
cccaactttc ccctaccccc aactttcccc accagctcca caaccctgtt tggagctact   3060
gcaggaccag aagcacaaag tgcggtttcc caagcctttg tccatctcag ccccagagt   3120
atatctgtgc ttggggaatc tcacacagaa actcaggagc accccctgcc tgagctaagg   3180
gaggtcttat ctctcagggg gggtttaagt gccgtttgca ataatgtcgt cttatttatt   3240
tagcggggtg aatattttat actgtaagtg agcaatcaga gtataatgtt tatggtgaca   3300
aaattaaagg ctttcttata tgtttaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa   3360
aaaaaaaara aaaaaaaaaa aaaaaaaaaa aaaaaaataa aaaaaaaaa               3410
```

```
<210> 111
<211> 1289
<212> DNA
<213> Homo sapien
```

<400> 111

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agccaggcgt ccctctgcct gcccactcag tggcaacacc cgggagctgt tttgtccttt      60
gtggagcctc agcagttccc tctttcagaa ctcactgcca agagccctga acaggagcca     120
ccatgcagtg cttcagcttc attaagacca tgatgatcct cttcaatttg ctcatctttc     180
tgtgtggtgc agccctgttg gcagtgggca tctgggtgtc aatcgatggg gcatcctttc     240
tgaagatctt cgggccactg tcgtccagtg ccatgcagtt gtcaacgtg ggctacttcc      300
tcatcgcagc cggcgttgtg gtctttgctc ttggtttcct gggctgctat ggtgctaaga     360
ctgagagcaa gtgtgccctc gtgacgttct tcttcatcct cctcctcatc ttcattgctg     420
aggttgcagc tgctgtggtc gccttggtgt acaccacaat ggctgagcac ttcctgacgt     480
tgctggtagt gcctgccatc aagaaagatt atggttccca ggaagacttc actcaagtgt     540
ggaacaccac catgaaaggg ctcaagtgct gtggcttcac caactatacg gattttgagg     600
actcacccta cttcaaagag aacagtgcct tcccccatt ctgttgcaat gacaacgtca      660
ccaacacagc caatgaaacc tgcaccaagc aaaaggctca cgaccaaaaa gtagagggtt     720
gcttcaatca gcttttgtat gacatccgaa ctaatgcagt caccgtgggt ggtgtggcag     780
ctggaattgg gggcctcgag ctggctgcca tgattgtgtc catgtatctg tactgcaatc     840
tacaataagt ccacttctgc ctctgccact actgctgcca catgggaact gtgaagaggc     900
accctggcaa gcagcagtga ttgggggagg ggacaggatc taacaatgtc acttgggcca     960
gaatggacct gccctttctg ctccagactt ggggctagat agggaccact cctttagcg     1020
atgcctgact ttccttccat tggtgggtgg atgggtgggg ggcattccag agcctctaag    1080
gtagccagtt ctgttgccca ttcccccagt ctattaaacc cttgatatgc cccctaggcc    1140
tagtggtgat cccagtgctc tactggggga tgagagaaag gcattttata gcctgggcat    1200
aagtgaaatc agcagagcct ctgggtggat gtgtagaagg cacttcaaaa tgcataaacc    1260
tgttacaatg ttaaaaaaaa aaaaaaaaa                                       1289
```

<210> 112
<211> 315
<212> PRT
<213> Homo sapien

<400> 112

```
Met Val Phe Thr Val Arg Leu Leu His Ile Phe Thr Val Asn Lys Gln
1               5                   10                  15
Leu Gly Pro Lys Ile Val Ile Val Ser Lys Met Met Lys Asp Val Phe
            20                  25                  30
Phe Phe Leu Phe Phe Leu Gly Val Trp Leu Val Ala Tyr Gly Val Ala
        35                  40                  45
Thr Glu Gly Leu Leu Arg Pro Arg Asp Ser Asp Phe Pro Ser Ile Leu
    50                  55                  60
Arg Arg Val Phe Tyr Arg Pro Tyr Leu Gln Ile Phe Gly Gln Ile Pro
65                  70                  75                  80
Gln Glu Asp Met Asp Val Ala Leu Met Glu His Ser Asn Cys Ser Ser
                85                  90                  95
Glu Pro Gly Phe Trp Ala His Pro Pro Gly Ala Gln Ala Gly Thr Cys
                100                 105                 110
Val Ser Gln Tyr Ala Asn Trp Leu Val Val Leu Leu Leu Val Ile Phe
            115                 120                 125
Leu Leu Val Ala Asn Ile Leu Leu Val Asn Leu Leu Ile Ala Met Phe
    130                 135                 140
Ser Tyr Thr Phe Gly Lys Val Gln Gly Asn Ser Asp Leu Tyr Trp Lys
145                 150                 155                 160
Ala Gln Arg Tyr Arg Leu Ile Arg Glu Phe His Ser Arg Pro Ala Leu
                165                 170                 175
Ala Pro Pro Phe Ile Val Ile Ser His Leu Arg Leu Leu Leu Arg Gln
                180                 185                 190
Leu Cys Arg Arg Pro Arg Ser Pro Gln Pro Ser Ser Pro Ala Leu Glu
```

```
              195                    200                    205
His Phe Arg Val Tyr Leu Ser Lys Glu Ala Glu Arg Lys Leu Leu Thr
    210                    215                    220
Trp Glu Ser Val His Lys Glu Asn Phe Leu Leu Ala Arg Ala Arg Asp
225                    230                    235                    240
Lys Arg Glu Ser Asp Ser Glu Arg Leu Lys Arg Thr Ser Gln Lys Val
                   245                    250                    255
Asp Leu Ala Leu Lys Gln Leu Gly His Ile Arg Glu Tyr Glu Gln Arg
                   260                    265                    270
Leu Lys Val Leu Glu Arg Glu Val Gln Gln Cys Ser Arg Val Leu Gly
                   275                    280                    285
Trp Val Ala Glu Ala Leu Ser Arg Ser Ala Leu Leu Pro Pro Gly Gly
    290                    295                    300
Pro Pro Pro Pro Asp Leu Pro Gly Ser Lys Asp
305                    310                    315
```

```
         <210> 113
         <211> 553
         <212> PRT
         <213> Homo sapien


         <400> 113
Met Val Gln Arg Leu Trp Val Ser Arg Leu Leu Arg His Arg Lys Ala
1                   5                    10                    15
Gln Leu Leu Leu Val Asn Leu Leu Thr Phe Gly Leu Glu Val Cys Leu
                   20                    25                    30
Ala Ala Gly Ile Thr Tyr Val Pro Pro Leu Leu Leu Glu Val Gly Val
         35                    40                    45
Glu Glu Lys Phe Met Thr Met Val Leu Gly Ile Gly Pro Val Leu Gly
         50                    55                    60
Leu Val Cys Val Pro Leu Leu Gly Ser Ala Ser Asp His Trp Arg Gly
65                    70                    75                    80
Arg Tyr Gly Arg Arg Arg Pro Phe Ile Trp Ala Leu Ser Leu Gly Ile
                   85                    90                    95
Leu Leu Ser Leu Phe Leu Ile Pro Arg Ala Gly Trp Leu Ala Gly Leu
                   100                   105                   110
Leu Cys Pro Asp Pro Arg Pro Leu Glu Leu Ala Leu Leu Ile Leu Gly
         115                   120                   125
Val Gly Leu Leu Asp Phe Cys Gly Gln Val Cys Phe Thr Pro Leu Glu
    130                   135                   140
Ala Leu Leu Ser Asp Leu Phe Arg Asp Pro Asp His Cys Arg Gln Ala
145                   150                   155                   160
Tyr Ser Val Tyr Ala Phe Met Ile Ser Leu Gly Gly Cys Leu Gly Tyr
                   165                   170                   175
Leu Leu Pro Ala Ile Asp Trp Asp Thr Ser Ala Leu Ala Pro Tyr Leu
                   180                   185                   190
Gly Thr Gln Glu Glu Cys Leu Phe Gly Leu Leu Thr Leu Ile Phe Leu
         195                   200                   205
Thr Cys Val Ala Ala Thr Leu Leu Val Ala Glu Glu Ala Ala Leu Gly
    210                   215                   220
Pro Thr Glu Pro Ala Glu Gly Leu Ser Ala Pro Ser Leu Ser Pro His
225                    230                   235                   240
Cys Cys Pro Cys Arg Ala Arg Leu Ala Phe Arg Asn Leu Gly Ala Leu
                   245                   250                   255
Leu Pro Arg Leu His Gln Leu Cys Cys Arg Met Pro Arg Thr Leu Arg
```

```
                   260                    265                    270
Arg Leu Phe Val Ala Glu Leu Cys Ser Trp Met Ala Leu Met Thr Phe
        275                    280                    285
Thr Leu Phe Tyr Thr Asp Phe Val Gly Glu Gly Leu Tyr Gln Gly Val
        290                    295                    300
Pro Arg Ala Glu Pro Gly Thr Glu Ala Arg Arg His Tyr Asp Glu Gly
 305                    310                    315                    320
Val Arg Met Gly Ser Leu Gly Leu Phe Leu Gln Cys Ala Ile Ser Leu
                325                    330                    335
Val Phe Ser Leu Val Met Asp Arg Leu Val Gln Arg Phe Gly Thr Arg
            340                    345                    350
Ala Val Tyr Leu Ala Ser Val Ala Ala Phe Pro Val Ala Ala Gly Ala
            355                    360                    365
Thr Cys Leu Ser His Ser Val Ala Val Val Thr Ala Ser Ala Ala Leu
     370                    375                    380
Thr Gly Phe Thr Phe Ser Ala Leu Gln Ile Leu Pro Tyr Thr Leu Ala
 385                    390                    395                    400
Ser Leu Tyr His Arg Glu Lys Gln Val Phe Leu Pro Lys Tyr Arg Gly
                405                    410                    415
Asp Thr Gly Gly Ala Ser Ser Glu Asp Ser Leu Met Thr Ser Phe Leu
            420                    425                    430
Pro Gly Pro Lys Pro Gly Ala Pro Phe Pro Asn Gly His Val Gly Ala
     435                    440                    445
Gly Gly Ser Gly Leu Leu Pro Pro Pro Ala Leu Cys Gly Ala Ser
 450                    455                    460
Ala Cys Asp Val Ser Val Arg Val Val Val Gly Glu Pro Thr Glu Ala
 465                    470                    475                    480
Arg Val Val Pro Gly Arg Gly Ile Cys Leu Asp Leu Ala Ile Leu Asp
                485                    490                    495
Ser Ala Phe Leu Leu Ser Gln Val Ala Pro Ser Leu Phe Met Gly Ser
            500                    505                    510
Ile Val Gln Leu Ser Gln Ser Val Thr Ala Tyr Met Val Ser Ala Ala
            515                    520                    525
Gly Leu Gly Leu Val Ala Ile Tyr Phe Ala Thr Gln Val Val Phe Asp
     530                    535                    540
Lys Ser Asp Leu Ala Lys Tyr Ser Ala
 545                    550
```

```
        <210> 114
        <211> 241
        <212> PRT
        <213> Homo sapien


        <400> 114
Met Gln Cys Phe Ser Phe Ile Lys Thr Met Met Ile Leu Phe Asn Leu
 1               5                   10                  15
Leu Ile Phe Leu Cys Gly Ala Ala Leu Leu Ala Val Gly Ile Trp Val
            20                  25                  30
Ser Ile Asp Gly Ala Ser Phe Leu Lys Ile Phe Gly Pro Leu Ser Ser
            35                  40                  45
Ser Ala Met Gln Phe Val Asn Val Gly Tyr Phe Leu Ile Ala Ala Gly
     50                  55                  60
Val Val Val Phe Ala Leu Gly Phe Leu Gly Cys Tyr Gly Ala Lys Thr
 65                  70                  75                  80
Glu Ser Lys Cys Ala Leu Val Thr Phe Phe Phe Ile Leu Leu Leu Ile
```

```
                    85                   90                    95
    Phe Ile Ala Glu Val Ala Ala Ala Val Val Ala Leu Val Tyr Thr Thr
                100                  105                   110
    Met Ala Glu His Phe Leu Thr Leu Leu Val Val Pro Ala Ile Lys Lys
            115                  120                   125
    Asp Tyr Gly Ser Gln Glu Asp Phe Thr Gln Val Trp Asn Thr Thr Met
        130                  135                  140
    Lys Gly Leu Lys Cys Cys Gly Phe Thr Asn Tyr Thr Asp Phe Glu Asp
    145                  150                  155                  160
    Ser Pro Tyr Phe Lys Glu Asn Ser Ala Phe Pro Pro Phe Cys Cys Asn
                165                  170                  175
    Asp Asn Val Thr Asn Thr Ala Asn Glu Thr Cys Thr Lys Gln Lys Ala
                180                  185                  190
    His Asp Gln Lys Val Glu Gly Cys Phe Asn Gln Leu Leu Tyr Asp Ile
        195                  200                  205
    Arg Thr Asn Ala Val Thr Val Gly Gly Val Ala Ala Gly Ile Gly Gly
        210                  215                  220
    Leu Glu Leu Ala Ala Met Ile Val Ser Met Tyr Leu Tyr Cys Asn Leu
    225                  230                  235                  240
    Gln
```

```
        <210> 115
        <211> 366
        <212> DNA
        <213> Homo sapien

        <400> 115
gctctttctc tcccctcctc tgaatttaat tctttcaact tgcaatttgc aaggattaca      60
catttcactg tgatgtatat tgtgttgcaa aaaaaaaaaa gtgtctttgt ttaaaattac     120
ttggtttgtg aatccatctt gcttttttccc cattggaact agtcattaac ccatctctga     180
actggtagaa aaacatctga agagctagtc tatcagcatc tgacaggtga attggatggt     240
tctcagaacc atttcaccca gacagcctgt ttctatcctg tttaataaat tagtttgggt     300
tctctacatg cataacaaac cctgctccaa tctgtcacat aaaagtctgt gacttgaagt     360
ttagtc                                                               366

        <210> 116
        <211> 282
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(282)
        <223> n = A,T,C or G

        <400> 116
acaaagatga accatttcct atattatagc aaaattaaaa tctacccgta ttctaatatt      60
gagaaatgag atnaaacaca atnttataaa gtctacttag agaagatcaa gtgacctcaa     120
agactttact attttcatat tttaagacac atgatttatc ctatttttagt aacctggttc     180
atacgttaaa caaaggataa tgtgaacagc agagaggatt tgttggcaga aaatctatgt     240
tcaatctnga actatctana tcacagacat ttctattcct tt                       282

        <210> 117
        <211> 305
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        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(305)
        <223> n = A,T,C or G

        <400> 117
acacatgtcg cttcactgcc ttcttagatg cttctggtca acatanagga acagggacca     60
tatttatcct ccctcctgaa acaattgcaa aataanacaa aatatatgaa acaattgcaa    120
aataaggcaa aatatatgaa acaacaggtc tcgagatatt ggaaatcagt caatgaagga    180
tactgatccc tgatcactgt cctaatgcag gatgtgggaa acagatgagg tcacctctgt    240
gactgcccca gcttactgcc tgtagagagt ttctangctg cagttcagac agggagaaat    300
tgggt                                                               305

        <210> 118
        <211> 71
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(71)
        <223> n = A,T,C or G

        <400> 118
accaaggtgt ntgaatctct gacgtgggga tctctgattc ccgcacaatc tgagtggaaa     60
aantcctggg t                                                         71

        <210> 119
        <211> 212
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(212)
        <223> n = A,T,C or G

        <400> 119
actccggttg gtgtcagcag cacgtggcat tgaacatngc aatgtggagc ccaaaccaca     60
gaaaatgggg tgaaattggc caactttcta tnaacttatg ttggcaantt tgccaccaac    120
agtaagctgg cccttctaat aaaagaaaat tgaaaggttt ctcactaanc ggaattaant    180
aatggantca aganactccc aggcctcagc gt                                  212

        <210> 120
        <211> 90
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(90)
        <223> n = A,T,C or G
```

```
        <400> 120
actcgttgca natcaggggc cccccagagt caccgttgca ggagtccttc tggtcttgcc        60
ctccgccggc gcagaacatg ctggggtggt                                        90


        <210> 121
        <211> 218
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(218)
        <223> n = A,T,C or G


        <400> 121
tgtancgtga anacgacaga nagggttgtc aaaaatggag aanccttgaa gtcattttga        60
gaataagatt tgctaaaaga tttggggcta aaacatggtt attgggagac atttctgaag       120
atatncangt aaattangga atgaattcat ggttcttttg ggaattcctt tacgatngcc      180
agcatanact tcatgtgggg atancagcta cccttgta                              218


        <210> 122
        <211> 171
        <212> DNA
        <213> Homo sapien


        <400> 122
taggggtgta tgcaactgta aggacaaaaa ttgagactca actggcttaa ccaataaagg        60
catttgttag ctcatggaac aggaagtcgg atggtggggc atcttcagtg ctgcatgagt       120
caccaccccg gcggggtcat ctgtgccaca ggtccctgtt gacagtgcgg t               171


        <210> 123
        <211> 76
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(76)
        <223> n = A,T,C or G


        <400> 123
tgtagcgtga agacnacaga atggtgtgtg ctgtgctatc caggaacaca tttattatca        60
ttatcaanta ttgtgt                                                        76


        <210> 124
        <211> 131
        <212> DNA
        <213> Homo sapien


        <400> 124
acctttcccc aaggccaatg tcctgtgtgc taactggccg gctgcaggac agctgcaatt        60
caatgtgctg ggtcatatgg aggggaggag actctaaaat agccaatttt attctcttgg       120
ttaagatttg t                                                            131
```

<210> 125
<211> 432
<212> DNA
<213> Homo sapien

<400> 125
acttatctata ctggctatga aatagatggt ggaaaattgc gttaccaact ataccactgg   60
cttgaaaaag aggtgatagc tcttcagagg acttgtgact tttgctcaga tgctgaagaa   120
ctacagtctg catttggcag aaatgaagat gaatttggat taaatgagga tgctgaagat   180
ttgcctcacc aaacaaaagt gaaacaactg agagaaaatt ttcaggaaaa aagacagtgg   240
ctcttgaagt atcagtcact tttgagaatg tttcttagtt actgcatact tcatggatcc   300
catggtgggg gtcttgcatc tgtaagaatg gaattgattt tgcttttgca agaatctcag   360
caggaaacat cagaaccact attttctagc cctctgtcag agcaaacctc agtgcctctc   420
ctctttgctt gt   432

<210> 126
<211> 112
<212> DNA
<213> Homo sapien

<400> 126
acacaacttg aatagtaaaa tagaaactga gctgaaattt ctaattcact ttctaaccat   60
agtaagaatg atatttcccc ccagggatca ccaaatattt ataaaaattt gt   112

<210> 127
<211> 54
<212> DNA
<213> Homo sapien

<400> 127
accacgaaac cacaaacaag atggaagcat caatccactt gccaagcaca gcag   54

<210> 128
<211> 323
<212> DNA
<213> Homo sapien

<400> 128
acctcattag taattgtttt gttgtttcat ttttttctaa tgtctcccct ctaccagctc   60
acctgagata acagaatgaa aatggaagga cagccagatt tctcctttgc tctctgctca   120
ttctctctga agtctaggtt acccattttg gggacccatt ataggcaata aacacagttc   180
ccaaagcatt tggacagttt cttgttgtgt tttagaatgg ttttcctttt tcttagcctt   240
ttcctgcaaa aggctcactc agtcccttgc ttgctcagtg gactgggctc cccagggcct   300
aggctgcctt cttttccatg tcc   323

<210> 129
<211> 192
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(192)
<223> n = A,T,C or G

<400> 129
```
acatacatgt gtgtatattt ttaaatatca cttttgtatc actctgactt tttagcatac    60
tgaaaacaca ctaacataat ttntgtgaac catgatcaga tacaacccaa atcattcatc   120
tagcacattc atctgtgata naaagatagg tgagtttcat ttccttcacg ttggccaatg   180
gataaacaaa gt                                                        192
```

        <210> 130
        <211> 362
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(362)
        <223> n = A,T,C or G

        <400> 130
```
cccttttta tggaatgagt agactgtatg tttgaanatt tanccacaac ctctttgaca    60
tataatgacg caacaaaaag gtgctgttta gtcctatggt tcagtttatg cccctgacaa   120
gtttccattg tgttttgccg atcttctggc taatcgtggt atcctccatg ttattagtaa   180
ttctgtattc cattttgtta acgcctggta gatgtaacct gctangaggc taactttata   240
cttatttaaa agctcttatt ttgtggtcat taaaatggca atttatgtgc agcactttat   300
tgcagcagga agcacgtgtg ggttggttgt aaagctcttt gctaatctta aaaagtaatg   360
gg                                                                   362
```

        <210> 131
        <211> 332
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(332)
        <223> n = A,T,C or G

        <400> 131
```
ctttttgaaa gatcgtgtcc actcctgtgg acatcttgtt ttaatggagt ttcccatgca    60
gtangactgg tatggttgca gctgtccaga taaaaacatt tgaagagctc caaaatgaga   120
gttctcccag gttcgccctg ctgctccaag tctcagcagc agcctctttt aggaggcatc   180
ttctgaacta gattaaggca gcttgtaaat ctgatgtgat ttggtttatt atccaactaa   240
cttccatctg ttatcactgg agaaagccca gactccccan gacnggtacg gattgtgggc   300
atanaaggat tgggtgaagc tggcgttgtg gt                                  332
```

        <210> 132
        <211> 322
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(322)
        <223> n = A,T,C or G

        <400> 132
```
acttttgcca ttttgtatat ataaacaatc ttgggacatt ctcctgaaaa ctaggtgtcc    60
```

```
agtggctaag agaactcgat ttcaagcaat tctgaaagga aaaccagcat gacacagaat      120
ctcaaattcc caaacagggg ctctgtggga aaaatgaggg aggacctttg tatctcgggt      180
tttagcaagt taaaatgaan atgacaggaa aggcttattt atcaacaaag agaagagttg      240
ggatgcttct aaaaaaaact ttggtagaga aaataggaat gctnaatcct agggaagcct      300
gtaacaatct acaattggtc ca                                               322
```

```
        <210> 133
        <211> 278
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(278)
        <223> n = A,T,C or G

        <400> 133
acaagccttc acaagtttaa ctaaattggg attaatcttt ctgtanttat ctgcataatt       60
cttgtttttc tttccatctg gctcctgggt tgacaatttg tggaaacaac tctattgcta      120
ctatttaaaa aaaatcacaa atctttccct ttaagctatg ttnaattcaa actattcctg      180
ctattcctgt tttgtcaaag aaattatatt tttcaaaata tgtntatttg tttgatgggt      240
cccacgaaac actaataaaa accacagaga ccagcctg                              278
```

```
        <210> 134
        <211> 121
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(121)
        <223> n = A,T,C or G

        <400> 134
gtttanaaaa cttgtttagc tccatagagg aaagaatgtt aaactttgta ttttaaaaca       60
tgattctctg aggttaaact tggttttcaa atgttatttt tacttgtatt ttgcttttgg      120
t                                                                      121
```

```
        <210> 135
        <211> 350
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(350)
        <223> n = A,T,C or G

        <400> 135
acttanaacc atgcctagca catcagaatc cctcaaagaa catcagtata atcctatacc       60
atancaagtg gtgactggtt aagcgtgcga caaaggtcag ctggcacatt acttgtgtgc      120
aaacttgata cttttgttct aagtaggaac tagtatacag tncctaggan tggtactcca      180
gggtgccccc caactcctgc agccgctcct ctgtgccagn ccctgnaagg aactttcgct      240
ccacctcaat caagccctgg gccatgctac ctgcaattgg ctgaacaaac gtttgctgag      300
ttcccaagga tgcaaagcct ggtgctcaac tcctggggcg tcaactcagt              350
```

```
        <210> 136
        <211> 399
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(399)
        <223> n = A,T,C or G


        <400> 136
tgtaccgtga agacgacaga agttgcatgg cagggacagg gcagggccga ggccagggtt      60
gctgtgattg tatccgaata ntcctcgtga gaaaagataa tgagatgacg tgagcagcct     120
gcagacttgt gtctgccttc aanaagccag acaggaaggc cctgcctgcc ttggctctga     180
cctggcggcc agccagccag ccacaggtgg gcttcttcct tttgtggtga caacnccaag     240
aaaactgcag aggcccaggg tcaggtgtna gtgggtangt gaccataaaa caccaggtgc     300
tcccaggaac ccgggcaaag gccatcccca cctacagcca gcatgcccac tggcgtgatg     360
ggtgcagang gatgaagcag ccagntgttc tgctgtggt                            399


        <210> 137
        <211> 165
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(165)
        <223> n = A,T,C or G


        <400> 137
actggtgtgg tnggggtga tgctggtggt anaagttgan gtgacttcan gatggtgtgt       60
ggaggaagtg tgtgaacgta gggatgtaga ngttttggcc gtgctaaatg agcttcggga     120
ttggctggtc ccactggtgg tcactgtcat tggtggggtt cctgt                     165


        <210> 138
        <211> 338
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(338)
        <223> n = A,T,C or G


        <400> 138
actcactgga atgccacatt cacaacagaa tcagaggtct gtgaaaacat taatggctcc       60
ttaacttctc cagtaagaat cagggacttg aaatggaaac gttaacagcc acatgcccaa     120
tgctgggcag tctcccatgc cttccacagt gaaagggctt gagaaaaatc acatccaatg     180
tcatgtgttt ccagccacac caaaaggtgc ttggggtgga gggctggggg catananggt     240
cangcctcag gaagcctcaa gttccattca gctttgccac tgtacattcc ccatntttaa     300
aaaaactgat gcctttttt tttttttttg taaaattc                              338


        <210> 139
        <211> 382
```

```
        <212>  DNA
        <213>  Homo sapien

        <400>  139
gggaatcttg  gttttggca  tctggtttgc  ctatagccga  ggccactttg  acagaacaaa    60
gaaagggact  tcgagtaaga  aggtgattta  cagccagcct  agtgcccgaa  gtgaaggaga    120
attcaaacag  acctcgtcat  tcctggtgtg  agcctggtcg  gctcaccgcc  tatcatctgc    180
atttgcctta  ctcaggtgct  accggactct  ggcccctgat  gtctgtagtt  tcacaggatg    240
ccttatttgt  cttctacacc  ccacagggcc  ccctacttct  tcggatgtgt  ttttaataat    300
gtcagctatg  tgccccatcc  tccttcatgc  cctccctccc  tttcctacca  ctgctgagtg    360
gcctggaact  tgtttaaagt  gt                                                382


        <210>  140
        <211>  200
        <212>  DNA
        <213>  Homo sapien

        <220>
        <221>  misc_feature
        <222>  (1)...(200)
        <223>  n = A,T,C or G

        <400>  140
accaaanctt  ctttctgttg  tgttngattt  tactataggg  gtttngcttn  ttctaaanat    60
actttcatt   taacancttt  tgttaagtgt  caggctgcac  tttgctccat  anaattattg    120
ttttcacatt  tcaacttgta  tgtgtttgtc  tcttanagca  ttggtgaaat  cacatatttt    180
atattcagca  taaaggagaa                                                    200


        <210>  141
        <211>  335
        <212>  DNA
        <213>  Homo sapien

        <220>
        <221>  misc_feature
        <222>  (1)...(335)
        <223>  n = A,T,C or G

        <400>  141
actttatttt  caaaacactc  atatgttgca  aaaaacacat  agaaaaataa  agtttggtgg    60
gggtgctgac  taaacttcaa  gtcacagact  tttatgtgac  agattggagc  agggtttgtt    120
atgcatgtag  agaacccaaa  ctaatttatt  aaacaggata  gaaacaggct  gtctgggtga    180
aatggttctg  agaaccatcc  aattcacctg  tcagatgctg  atanactagc  tcttcagatg    240
tttttctacc  agttcagaga  tnggttaatg  actanttcca  atggggaaaa  agcaagatgg    300
attcacaaac  caagtaattt  taaacaaaga  cactt                                 335


        <210>  142
        <211>  459
        <212>  DNA
        <213>  Homo sapien

        <220>
        <221>  misc_feature
        <222>  (1)...(459)
        <223>  n = A,T,C or G
```

```
        <400> 142
accaggttaa tattgccaca tatatccttt ccaattgcgg gctaaacaga cgtgtattta        60
gggttgttta aagacaaccc agcttaatat caagagaaat tgtgaccttt catggagtat       120
ctgatggaga aaacactgag ttttgacaaa tcttatttta ttcagatagc agtctgatca       180
cacatggtcc aacaacactc aaataataaa tcaaatatna tcagatgtta aagattggtc       240
ttcaaacatc atagccaatg atgccccgct tgcctataat ctctccgaca taaaaccaca       300
tcaacacctc agtggccacc aaaccattca gcacagcttc cttaactgtg agctgtttga       360
agctaccagt ctgagcacta ttgactatnt ttttcangct ctgaatagct ctaggggatct      420
cagcangggt gggaggaacc agctcaacct tggcgtant                             459
```

```
        <210> 143
        <211> 140
        <212> DNA
        <213> Homo sapien
```

```
        <400> 143
acatttcctt ccaccaagtc aggactcctg gcttctgtgg gagttcttat cacctgaggg        60
aaatccaaac agtctctcct agaaaggaat agtgtcacca accccaccca tctccctgag       120
accatccgac ttccctgtgt                                                  140
```

```
        <210> 144
        <211> 164
        <212> DNA
        <213> Homo sapien
```

```
        <220>
        <221> misc_feature
        <222> (1)...(164)
        <223> n = A,T,C or G
```

```
        <400> 144
acttcagtaa caacatacaa taacaacatt aagtgtatat tgccatcttt gtcattttct        60
atctatacca ctctcccttc tgaaaacaan aatcactanc caatcactta tacaaatttg       120
aggcaattaa tccatatttg ttttcaataa ggaaaaaaag atgt                       164
```

```
        <210> 145
        <211> 303
        <212> DNA
        <213> Homo sapien
```

```
        <220>
        <221> misc_feature
        <222> (1)...(303)
        <223> n = A,T,C or G
```

```
        <400> 145
acgtagacca tccaactttg tatttgtaat ggcaaacatc cagnagcaat tcctaaacaa        60
actggagggt atttataccc aattatccca ttcattaaca tgccctcctc ctcaggctat       120
gcaggacagc tatcataagt cggcccaggc atccagatac taccatttgt ataaacttca       180
gtaggggagt ccatccaagt gacaggtcta atcaaaggag gaaatggaac ataagcccag       240
tagtaaaatn ttgcttagct gaaacagcca caaaagactt accgccgtgg tgattaccat       300
caa                                                                    303
```

```
        <210> 146
```

```
<211> 327
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(327)
<223> n = A,T,C or G

<400> 146
actgcagctc aattagaagt ggtctctgac tttcatcanc ttctccctgg gctccatgac      60
actggcctgg agtgactcat tgctctggtt ggttgagaga gctcctttgc caacaggcct     120
ccaagtcagg gctgggattt gtttcctttc cacattctag caacaatatg ctggccactt     180
cctgaacagg gagggtggga ggagccagca tggaacaagc tgccactttc taaagtagcc     240
agacttgccc ctgggcctgt cacacctact gatgaccttc tgtgcctgca ggatggaatg     300
tagggctgag ctgtgtgact ctatggt                                         327


<210> 147
<211> 173
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(173)
<223> n = A,T,C or G

<400> 147
acattgtttt tttgagataa agcattgana gagctctcct taacgtgaca caatggaagg      60
actggaacac atacccacat ctttgttctg agggataatt ttctgataaa gtcttgctgt     120
atattcaagc acatatgtta tatattattc agttccatgt ttatagccta gtt            173


<210> 148
<211> 477
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(477)
<223> n = A,T,C or G

<400> 148
acaaccactt tatctcatcg aatttttaac ccaaactcac tcactgtgcc tttctatcct      60
atgggatata ttatttgatg ctccatttca tcacacatat atgaataata cactcatact     120
gccctactac ctgctgcaat aatcacattc ccttcctgtc ctgaccctga agccattggg     180
gtggtcctag tggccatcag tccangcctg caccttgagc ccttgagctc cattgctcac     240
nccancccac ctcaccgacc ccatcctctt acacagctac ctccttgctc tctaacccca     300
tagattatnt ccaaattcag tcaattaagt tactattaac actctacccg acatgtccag     360
caccactggt aagccttctc cagccaacac acacacacac acacncacac acacacatat     420
ccaggcacag gctacctcat cttcacaatc accccttttaa ttaccatgct atggtgg       477


<210> 149
<211> 207
<212> DNA
```

<213> Homo sapien

<400> 149
acagttgtat tataatatca agaaataaac ttgcaatgag agcatttaag agggaagaac   60
taacgtattt tagagagcca aggaaggttt ctgtggggag tgggatgtaa ggtggggcct   120
gatgataaat aagagtcagc caggtaagtg ggtggtgtgg tatgggcaca gtgaagaaca   180
tttcaggcag agggaacagc agtgaaa   207

          <210> 150
          <211> 111
          <212> DNA
          <213> Homo sapien

          <220>
          <221> misc_feature
          <222> (1)...(111)
          <223> n = A,T,C or G

          <400> 150
accttgattt cattgctgct ctgatggaaa cccaactatc taatttagct aaaacatggg   60
cacttaaatg tggtcagtgt ttggacttgt taactantgg catctttggg t   111

          <210> 151
          <211> 196
          <212> DNA
          <213> Homo sapien

          <400> 151
agcgcggcag gtcatattga acattccaga tacctatcat tactcgatgc tgttgataac   60
agcaagatgg ctttgaactc agggtcacca ccagctattg gaccttacta tgaaaaccat   120
ggataccaac cggaaaaccc ctatcccgca cagcccactg tggtccccac tgtctacgag   180
gtgcatccgg ctcagt   196

          <210> 152
          <211> 132
          <212> DNA
          <213> Homo sapien

          <400> 152
acagcacttt cacatgtaag aagggagaaa ttcctaaatg taggagaaag ataacagaac   60
cttccccttt tcatctagtg gtggaaacct gatgctttat gttgacagga atagaaccag   120
gagggagttt gt   132

          <210> 153
          <211> 285
          <212> DNA
          <213> Homo sapien

          <220>
          <221> misc_feature
          <222> (1)...(285)
          <223> n = A,T,C or G

          <400> 153
acaanaccca nganaggcca ctggccgtgg tgtcatggcc tccaaacatg aaagtgtcag   60

```
cttctgctct tatgtcctca tctgacaact ctttaccatt tttatcctcg ctcagcagga      120
gcacatcaat aaagtccaaa gtcttggact tggccttggc ttggaggaag tcatcaacac      180
cctggctagt gagggtgcgg cgccgctcct ggatgacggc atctgtgaag tcgtgcacca      240
gtctgcaggc cctgtggaag cgccgtccac acggagtnag gaatt                      285
```

```
        <210> 154
        <211> 333
        <212> DNA
        <213> Homo sapien


        <400> 154
accacagtcc tgttgggcca gggcttcatg acccttctg tgaaaagcca tattatcacc      60
accccaaatt tttccttaaa tatctttaac tgaaggggtc agcctcttga ctgcaaagac      120
cctaagccgg ttacacagct aactcccact ggccctgatt tgtgaaattg ctgctgcctg      180
attggcacag gagtcgaagg tgttcagctc ccctcctccg tggaacgaga ctctgatttg      240
agtttcacaa attctcgggc cacctcgtca ttgctcctct gaaataaaat ccggagaatg      300
gtcaggcctg tctcatccat atggatcttc cgg                                   333
```

```
        <210> 155
        <211> 308
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(308)
        <223> n = A,T,C or G


        <400> 155
actggaaata ataaaaccca catcacagtg ttgtgtcaaa gatcatcagg gcatggatgg      60
gaaagtgctt tgggaactgt aaagtgccta acacatgatc gatgattttt gttataatat      120
ttgaatcacg gtgcatacaa actctcctgc ctgctcctcc tgggccccag ccccagcccc      180
atcacagctc actgctctgt tcatccaggc ccagcatgta gtggctgatt cttcttggct      240
gcttttagcc tccanaagtt tctctgaagc caaccaaacc tctangtgta aggcatgctg      300
gccctggt                                                               308
```

```
        <210> 156
        <211> 295
        <212> DNA
        <213> Homo sapien


        <400> 156
accttgctcg gtgcttggaa catattagga actcaaaata tgagatgata acagtgccta      60
ttattgatta ctgagagaac tgttagacat ttagttgaag attttctaca caggaactga      120
gaataggaga ttatgtttgg ccctcatatt ctctcctatc ctccttgcct cattctatgt      180
ctaatatatt ctcaatcaaa taaggttagc ataatcagga aatcgaccaa ataccaatat      240
aaaaccagat gtctatcctt aagattttca aatagaaaac aaattaacag actat           295
```

```
        <210> 157
        <211> 126
        <212> DNA
        <213> Homo sapien


        <400> 157
acaagtttaa atagtgctgt cactgtgcat gtgctgaaat gtgaaatcca ccacatttct      60
```

```
gaagagcaaa acaaattctg tcatgtaatc tctatcttgg gtcgtgggta tatctgtccc      120
cttagt                                                                  126
```

        <210> 158
        <211> 442
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(442)
        <223> n = A,T,C or G

        <400> 158

```
acccactggt cttggaaaca cccatcctta atacgatgat ttttctgtcg tgtgaaaatg       60
aanccagcag gctgcccta gtcagtcctt ccttccagag aaaaagagat ttgagaaagt        120
gcctgggtaa ttcaccatta atttcctccc ccaaactctc tgagtcttcc cttaatattt       180
ctggtggttc tgaccaaagc aggtcatggt ttgttgagca tttgggatcc cagtgaagta       240
natgtttgta gccttgcata cttagccctt cccacgcaca aacggagtgg cagagtggtg       300
ccaaccctgt tttcccagtc cacgtagaca gattcacagt gcggaattct ggaagctgga       360
nacagacggg ctctttgcag agccgggact ctgagangga catgagggcc tctgcctctg       420
tgttcattct ctgatgtcct gt                                                442
```

        <210> 159
        <211> 498
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(498)
        <223> n = A,T,C or G

        <400> 159

```
acttccaggt aacgttgttg tttccgttga gcctgaactg atgggtgacg ttgtaggttc       60
tccaacaaga actgaggttg cagagcgggt agggaagagt gctgttccag ttgcacctgg       120
gctgctgtgg actgttgttg attcctcact acggcccaag gttgtggaac tggcanaaag       180
gtgtgttgtt gganttgagc tcgggcggct gtggtaggtt gtgggctctt caacaggggc       240
tgctgtggtg ccgggangtg aangtgttgt gtcacttgag cttggccagc tctggaaagt       300
antanattct tcctgaaggc cagcgcttgt ggagctggca ngggtcantg ttgtgtgtaa       360
cgaaccagtg ctgctgtggg tgggtgtana tcctccacaa agcctgaagt tatggtgtcn       420
tcaggtaana atgtggtttc agtgtccctg ggcngctgtg gaaggttgta nattgtcacc       480
aagggaataa gctgtggt                                                     498
```

        <210> 160
        <211> 380
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(380)
        <223> n = A,T,C or G

        <400> 160

```
acctgcatcc agcttccctg ccaaactcac aaggagacat caacctctag acagggaaac      60
agcttcagga tacttccagg agacagagcc accagcagca aaacaaatat tcccatgcct     120
ggagcatggc atagaggaag ctganaaatg tggggtctga ggaagccatt tgagtctggc     180
cactagacat ctcatcagcc acttgtgtga agagatgccc catgacccca gatgcctctc     240
ccacccttac ctccatctca cacacttgag ctttccactc tgtataattc taacatcctg     300
gagaaaaatg gcagtttgac cgaacctgtt cacaacggta gaggctgatt tctaacgaaa     360
cttgtagaat gaagcctgga                                                 380
```

        <210> 161
        <211> 114
        <212> DNA
        <213> Homo sapien

        <400> 161
```
actccacatc ccctctgagc aggcggttgt cgttcaaggt gtatttggcc ttgcctgtca      60
cactgtccac tggcccctta tccacttggt gcttaatccc tcgaaagagc atgt           114
```

        <210> 162
        <211> 177
        <212> DNA
        <213> Homo sapien

        <400> 162
```
actttctgaa tcgaatcaaa tgatacttag tgtagtttta atatcctcat atatatcaaa      60
gttttactac tctgataatt ttgtaaacca ggtaaccaga acatccagtc atacagcttt     120
tggtgatata taacttggca ataacccagt ctggtgatac ataaaactac tcactgt        177
```

        <210> 163
        <211> 137
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(137)
        <223> n = A,T,C or G

        <400> 163
```
catttataca gacaggcgtg aagacattca cgacaaaaac gcgaaattct atcccgtgac      60
canagaaggc agctacggct actcctacat cctggcgtgg gtggccttcg cctgcacctt     120
catcagcggc atgatgt                                                    137
```

        <210> 164
        <211> 469
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(469)
        <223> n = A,T,C or G

        <400> 164
```
cttatcacaa tgaatgttct cctgggcagc gttgtgatct ttgccacctt cgtgacttta      60
tgcaatgcat catgctattt catacctaat gagggagttc caggagattc aaccaggaaa     120
```

```
tgcatggatc tcaaaggaaa caaacaccca ataaactcgg agtggcagac tgacaactgt        180
gagacatgca cttgctacga aacagaaatt tcatgttgca cccttgtttc tacacctgtg        240
ggttatgaca aagacaactg ccaaagaatc ttcaagaagg aggactgcaa gtatatcgtg        300
gtggagaaga aggacccaaa aaagacctgt tctgtcagtg aatggataat ctaatgtgct        360
tctagtaggc acagggctcc caggccaggc ctcattctcc tctggcctct aatagtcaat        420
gattgtgtag ccatgcctat cagtaaaaag atntttgagc aaacacttt                    469
```

```
<210> 165
<211> 195
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(195)
<223> n = A,T,C or G

<400> 165
```

```
acagtttttt atanatatcg acattgccgg cacttgtgtt cagtttcata aagctggtgg        60
atccgctgtc atccactatt ccttggctag agtaaaaatt attcttatag cccatgtccc        120
tgcaggccgc ccgcccgtag ttctcgttcc agtcgtcttg gcacacaggg tgccaggact        180
tcctctgaga tgagt                                                         195
```

```
<210> 166
<211> 383
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(383)
<223> n = A,T,C or G

<400> 166
```

```
acatcttagt agtgtggcac atcaggggc catcagggtc acagtcactc atagcctcgc         60
cgaggtcgga gtccacacca ccggtgtagg tgtgctcaat cttgggcttg gcgcccacct        120
ttggagaagg gatatgctgc acacacatgt ccacaaagcc tgtgaactcg ccaaagaatt        180
tttgcagacc agcctgagca aggggcggat gttcagcttc agctcctcct tcgtcaggtg        240
gatgccaacc tcgtctangg tccgtgggaa gctggtgtcc acntcaccta caacctgggc        300
gangatctta taaagaggct ccnagataaa ctccacgaaa cttctctggg agctgctagt        360
nggggccttt ttggtgaact ttc                                                383
```

```
<210> 167
<211> 247
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(247)
<223> n = A,T,C or G

<400> 167
```

```
acagagccag accttggcca taaatgaanc agagattaag actaaacccc aagtcganat        60
tggagcagaa actggagcaa gaagtgggcc tggggctgaa gtagagacca aggccactgc        120
```

```
tatanccata cacagagcca actctcaggc caaggcnatg gttggggcag anccagagac    180
tcaatctgan tccaaagtgg tggctggaac actggtcatg acanaggcag tgactctgac    240
tgangtc                                                              247
```

        <210> 168
        <211> 273
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(273)
        <223> n = A,T,C or G

        <400> 168
```
acttctaagt tttctagaag tggaaggatt gtantcatcc tgaaaatggg tttacttcaa     60
aatccctcan ccttgttctt cacnactgtc tatactgana gtgtcatgtt tccacaaagg    120
gctgacacct gagcctgnat tttcactcat ccctgagaag cccttttccag tagggtgggc   180
aattcccaac ttccttgcca caagcttccc aggctttctc ccctggaaaa ctccagcttg    240
agtcccagat acactcatgg gctgccctgg gca                                 273
```

        <210> 169
        <211> 431
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(431)
        <223> n = A,T,C or G

        <400> 169
```
acagccttgg cttccccaaa ctccacagtc tcagtgcaga aagatcatct tccagcagtc     60
agctcagacc agggtcaaag gatgtgacat caacagtttc tggtttcaga acaggttcta    120
ctactgtcaa atgacccccc atacttcctc aaaggctgtg gtaagttttg cacaggtgag    180
ggcagcagaa aggggtant tactgatgga caccatcttc tctgtatact ccacactgac     240
cttgccatgg gcaaaggccc ctaccacaaa aacaatagga tcactgctgg gcaccagctc    300
acgcacatca ctgacaaccg ggatggaaaa agaantgcca actttcatac atccaactgg    360
aaagtgatct gatactggat tcttaattac cttcaaaagc ttctgggggc catcagctgc    420
tcgaacactg a                                                         431
```

        <210> 170
        <211> 266
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(266)
        <223> n = A,T,C or G

        <400> 170
```
acctgtgggc tgggctgtta tgcctgtgcc ggctgctgaa agggagttca gaggtggagc     60
tcaaggagct ctgcaggcat tttgccaanc ctctccanag canaggagc aacctacact     120
ccccgctaga aagacaccag attggagtcc tgggagggg agttggggtg ggcatttgat     180
```

```
gtatacttgt cacctgaatg aangagccag agaggaanga gacgaanatg anattggcct    240
tcaaagctag gggtctggca ggtgga                                         266
```

```
        <210> 171
        <211> 1248
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(1248)
        <223> n = A,T,C or G

        <400> 171
ggcagccaaa tcataaacgg cgaggactgc agcccgcact cgcagccctg gcaggcggca     60
ctggtcatgg aaaacgaatt gttctgctcg ggcgtcctgg tgcatccgca gtgggtgctg    120
tcagccgcac actgtttcca gaagtgagtg cagagctcct acaccatcgg gctgggcctg    180
cacagtcttg aggccgacca agagccaggg agccagatgg tggaggccag cctctccgta    240
cggcacccag agtacaacag acccttgctc gctaacgacc tcatgctcat caagttggac    300
gaatccgtgt ccgagtctga caccatccgg agcatcagca ttgcttcgca gtgccctacc    360
gcggggaact cttgcctcgt ttctggctgg ggtctgctgg cgaacggcag aatgcctacc    420
gtgctgcagt gcgtgaacgt gtcggtggtg tctgaggagg tctgcagtaa gctctatgac    480
ccgctgtacc accccagcat gttctgcgcc ggcggagggc aagaccagaa ggactcctgc    540
aacggtgact ctggggggcc cctgatctgc aacgggtact tgcagggcct tgtgtctttc    600
ggaaaagccc cgtgtggcca agttggcgtg ccaggtgtct acaccaacct ctgcaaattc    660
actgagtgga tagagaaaac cgtccaggcc agttaactct ggggactggg aacccatgaa    720
attgaccccc aaatacatcc tgcggaagga attcaggaat atctgttccc agcccctcct    780
ccctcaggcc caggagtcca ggcccccagc ccctcctccc tcaaaccaag ggtacagatc    840
cccagcccct cctccctcag acccaggagt ccagaccccc cagcccctcc tccctcagac    900
ccaggagtcc agcccctcct ccctcagacc caggagtcca gaccccccag cccctcctcc    960
ctcagaccca ggggtccagg cccccaaccc ctcctccctc agactcagag gtccaagccc   1020
ccaacccntc attccccaga cccagaggtc caggtcccag cccctcntcc ctcagaccca   1080
gcggtccaat gccacctaga ctntccctgt acacagtgcc cccttgtggc acgttgaccc   1140
aaccttacca gttggttttt cattttttngt ccctttcccc tagatccaga aataaagttt   1200
aagagaagng caaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaa                  1248
```

```
        <210> 172
        <211> 159
        <212> PRT
        <213> Homo sapien

        <220>
        <221> VARIANT
        <222> (1)...(159)
        <223> Xaa = Any Amino Acid

        <400> 172
Met Val Glu Ala Ser Leu Ser Val Arg His Pro Glu Tyr Asn Arg Pro
 1               5                  10                  15
Leu Leu Ala Asn Asp Leu Met Leu Ile Lys Leu Asp Glu Ser Val Ser
                20                  25                  30
Glu Ser Asp Thr Ile Arg Ser Ile Ser Ile Ala Ser Gln Cys Pro Thr
                35                  40                  45
Ala Gly Asn Ser Cys Leu Val Ser Gly Trp Gly Leu Leu Ala Asn Gly
    50                  55                  60
```

```
Arg Met Pro Thr Val Leu Gln Cys Val Asn Val Ser Val Val Ser Glu
65                  70                  75                  80
Glu Val Cys Ser Lys Leu Tyr Asp Pro Leu Tyr His Pro Ser Met Phe
                85                  90                  95
Cys Ala Gly Gly Gly Gln Xaa Gln Xaa Asp Ser Cys Asn Gly Asp Ser
                100                 105                 110
Gly Gly Pro Leu Ile Cys Asn Gly Tyr Leu Gln Gly Leu Val Ser Phe
        115                 120                 125
Gly Lys Ala Pro Cys Gly Gln Val Gly Val Pro Gly Val Tyr Thr Asn
        130                 135                 140
Leu Cys Lys Phe Thr Glu Trp Ile Glu Lys Thr Val Gln Ala Ser
145                 150                 155
```

```
        <210> 173
        <211> 1265
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(1265)
        <223> n = A,T,C or G

        <400> 173
ggcagcccgc actcgcagcc ctggcaggcg gcactggtca tggaaaacga attgttctgc        60
tcgggcgtcc tggtgcatcc gcagtgggtg ctgtcagccg cacactgttt ccagaactcc       120
tacaccatcg ggctgggcct gcacagtctt gaggccgacc aagagccagg gagccagatg       180
gtggaggcca gcctctccgt acggcaccca gagtacaaca gaccccttgct cgctaacgac      240
ctcatgctca tcaagttgga cgaatccgtg tccgagtctg acaccatccg gagcatcagc       300
attgcttcgc agtgccctac cgcggggaac tcttgcctcg tttctggctg gggtctgctg       360
gcgaacggtg agctcacggg tgtgtgtctg ccctcttcaa ggaggtcctc tgcccagtcg        420
cggggctga cccagagctc tgcgtcccag gcagaatgcc taccgtgctg cagtgcgtga        480
acgtgtcggt ggtgtctgag gaggtctgca gtaagctcta tgaccgctg taccacccca        540
gcatgttctg cgccggcgga gggcaagacc agaaggactc ctgcaacggt gactctgggg       600
ggcccctgat ctgcaacggg tacttgcagg gccttgtgtc tttcggaaaa gccccgtgtg       660
gccaagttgg cgtgccaggt gtctacacca acctctgcaa attcactgag tggatagaga       720
aaaccgtcca ggccagttaa ctctggggac tgggaaccca tgaaattgac ccccaaatac       780
atcctgcgga aggaattcag gaatatctgt tcccagcccc tcctccctca ggcccaggag       840
tccaggcccc cagcccctcc tcccctcaaac caagggtaca gatcccagc ccctcctccc       900
tcagacccag gagtccagac ccccagccc ctcctccctc agacccagga gtccagcccc        960
tcctccntca gacccaggag tccagacccc ccagcccctc ctcctcaga cccaggggtt       1020
gaggccccca accccctcctc cttcagagtc agaggtccaa gccccaacc cctcgttccc       1080
cagacccaga ggtnnaggtc ccagcccctc ttccntcaga cccagnggtc caatgccacc      1140
tagattttcc ctgnacacag tgcccccttg tggnangttg acccaacctt accagttggt      1200
ttttcatttt tngtcccttt cccctagatc cagaaataaa gtttaagaga ngngcaaaaa      1260
aaaaa                                                                   1265
```

```
        <210> 174
        <211> 1459
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(1459)
```

<223> n = A,T,C or G

<400> 174

```
ggtcagccgc acactgtttc cagaagtgag tgcagagctc ctacaccatc gggctgggcc      60
tgcacagtct tgaggccgac caagagccag ggagccagat ggtggaggcc agcctctccg     120
tacggcaccc agagtacaac agacccttgc tcgctaacga cctcatgctc atcaagttgg     180
acgaatccgt gtccgagtct gacaccatcc ggagcatcag cattgcttcg cagtgcccta     240
ccgcggggaa ctcttgcctc gtttctggct ggggtctgct ggcgaacggt gagctcacgg     300
gtgtgtgtct gccctcttca aggaggtcct ctgcccagtc gcgggggctg acccagagct     360
ctgcgtccca ggcagaatgc ctaccgtgct gcagtgcgtg aacgtgtcgg tggtgtctga     420
ngaggtctgc antaagctct atgacccgct gtaccacccc ancatgttct cgccggcgg      480
agggcaagac cagaaggact cctgcaacgt gagagagggg aaaggggagg gcaggcgact     540
cagggaaggg tggagaaggg ggagacagag acacacaggg ccgcatggcg agatgcagag     600
atggagagac acacagggag acagtgacaa ctagagagag aaactgagag aaacagagaa     660
ataaacacag gaataaagag aagcaaagga agagagaaac agaaacagac atggggaggc     720
agaaacacac acacatagaa atgcagttga ccttccaaca gcatggggcc tgagggcggt     780
gacctccacc caatagaaaa tcctcttata acttttgact ccccaaaaac ctgactagaa     840
atagcctact gttgacgggg agccttacca ataacataaa tagtcgattt atgcatacgt     900
tttatgcatt catgatatac ctttgttgga attttttgat atttctaagc tacacagttc     960
gtctgtgaat ttttttaaat tgttgcaact ctcctaaaat ttttctgatg tgtttattga    1020
aaaaatccaa gtataagtgg acttgtgcat tcaaaccagg gttgttcaag ggtcaactgt    1080
gtacccagag ggaaacagtg acacagattc atagaggtga aacacgaaga gaaacaggaa    1140
aaatcaagac tctacaaaga ggctgggcag ggtggctcat gcctgtaatc ccagcacttt    1200
gggaggcgag gcaggcagat cacttgaggt aaggagttca agaccagcct ggccaaaatg    1260
gtgaaatcct gtctgtacta aaaatacaaa agttagctgg atatggtggc aggcgcctgt    1320
aatcccagct acttgggagg ctgaggcagg agaattgctt gaatatggga ggcagaggtt    1380
gaagtgagtt gagatcacac cactatactc cagctggggc aacagagtaa gactctgtct    1440
caaaaaaaaa aaaaaaaa                                                   1459
```

<210> 175
<211> 1167
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(1167)
<223> n = A,T,C or G

<400> 175

```
gcgcagccct ggcaggcggc actggtcatg gaaaacgaat tgttctgctc gggcgtcctg      60
gtgcatccgc agtgggtgct gtcagccgca cactgtttcc agaactccta caccatcggg     120
ctgggcctgc acagtcttga ggccgaccaa gagccaggga gccagatggt ggaggccagc     180
ctctccgtac ggcacccaga gtacaacaga ctcttgctcg ctaacgacct catgctcatc     240
aagttggacg aatccgtgtc cgagtctgac accatccgga gcatcagcat tgcttcgcag     300
tgccctaccg cggggaactc ttgcctcgtn tctggctggg gtctgctggc gaacggcaga     360
atgcctaccg tgctgcactg cgtgaacgtg tcggtggtgt ctgaggangt ctgcagtaag     420
ctctatgacc cgctgtacca ccccagcatg ttctcgccg cggagggca agaccagaag     480
gactcctgca acggtgactc tggggggccc ctgatctgca cgggtactt gcagggcctt     540
gtgtctttcg gaaaagcccc gtgtggccaa cttggcgtgc caggtgtcta caccaacctc     600
tgcaaattca ctgagtggat agagaaaacc gtccagncca gttaactctg gggactggga     660
acccatgaaa ttgacccca aatacatcct gcggaangaa ttcaggaata tctgttccca     720
gcccctcctc cctcaggccc aggagtccag gcccccagcc cctcctccct caaaccaagg     780
gtacagatcc ccagcccctc ctccctcaga cccaggagtc cagacccccc agcccctcnt     840
ccntcagacc caggagtcca gcccctcctc cntcagacgc aggagtccag acccccagc     900
```

65

```
ccntcntccg tcagacccag gggtgcaggc ccccaacccc tcntccntca gagtcagagg    960
tccaagcccc caacccctcg ttccccagac ccagaggtnc aggtcccagc ccctcctccc   1020
tcagacccag cggtccaatg ccacctagan tntccctgta cacagtgccc ccttgtggca   1080
ngttgaccca accttaccag ttggttttc atttttgtc ccttccccct agatccagaa     1140
ataaagtnta agagaagcgc aaaaaaa                                        1167
```

```
<210> 176
<211> 205
<212> PRT
<213> Homo sapien

<220>
<221> VARIANT
<222> (1)...(205)
<223> Xaa = Any Amino Acid

<400> 176
Met Glu Asn Glu Leu Phe Cys Ser Gly Val Leu Val His Pro Gln Trp
1               5                   10                  15
Val Leu Ser Ala Ala His Cys Phe Gln Asn Ser Tyr Thr Ile Gly Leu
            20                  25                  30
Gly Leu His Ser Leu Glu Ala Asp Gln Glu Pro Gly Ser Gln Met Val
        35                  40                  45
Glu Ala Ser Leu Ser Val Arg His Pro Glu Tyr Asn Arg Leu Leu Leu
    50                  55                  60
Ala Asn Asp Leu Met Leu Ile Lys Leu Asp Glu Ser Val Ser Glu Ser
65                  70                  75                  80
Asp Thr Ile Arg Ser Ile Ser Ile Ala Ser Gln Cys Pro Thr Ala Gly
                85                  90                  95
Asn Ser Cys Leu Val Ser Gly Trp Gly Leu Leu Ala Asn Gly Arg Met
            100                 105                 110
Pro Thr Val Leu His Cys Val Asn Val Ser Val Val Ser Glu Xaa Val
        115                 120                 125
Cys Ser Lys Leu Tyr Asp Pro Leu Tyr His Pro Ser Met Phe Cys Ala
    130                 135                 140
Gly Gly Gly Gln Asp Gln Lys Asp Ser Cys Asn Gly Asp Ser Gly Gly
145                 150                 155                 160
Pro Leu Ile Cys Asn Gly Tyr Leu Gln Gly Leu Val Ser Phe Gly Lys
                165                 170                 175
Ala Pro Cys Gly Gln Leu Gly Val Pro Gly Val Tyr Thr Asn Leu Cys
            180                 185                 190
Lys Phe Thr Glu Trp Ile Glu Lys Thr Val Gln Xaa Ser
    195                 200                 205

<210> 177
<211> 1119
<212> DNA
<213> Homo sapien

<400> 177
gcgcactcgc agccctggca ggcggcactg gtcatggaaa acgaattgtt ctgctcgggc     60
gtcctggtgc atccgcagtg ggtgctgtca gccgcacact gtttccagaa ctcctacacc    120
atcgggctgg gcctgcacag tcttgaggcc gaccaagagc cagggagcca gatggtggag    180
gccagcctct ccgtacggca cccagagtac aacagaccct tgctcgctaa cgacctcatg    240
ctcatcaagt tggacgaatc cgtgtccgag tctgacacca tccggagcat cagcattgct    300
```

```
tcgcagtgcc ctaccgcggg gaactcttgc ctcgtttctg ctgggggtct gctggcgaac    360
gatgctgtga ttgccatcca gtcccagact gtgggaggct gggagtgtga gaagctttcc    420
caaccctggc agggttgtac catttcggca acttccagtg caaggacgtc ctgctgcatc    480
ctcactgggt gctcactact gctcactgca tcacccggaa cactgtgatc aactagccag    540
caccatagtt ctccgaagtc agactatcat gattactgtg ttgactgtgc tgtctattgt    600
actaaccatg ccgatgttta ggtgaaatta gcgtcacttg cctcaacca tcttggtatc    660
cagttatcct cactgaattg agatttcctg cttcagtgtc agccattccc acataattc     720
tgacctacag aggtgaggga tcatatagct cttcaaggat gctggtactc ccctcacaaa    780
ttcatttctc ctgttgtagt gaaaggtgcg ccctctggag cctcccaggg tgggtgtgca    840
ggtcacaatg atgaatgtat gatcgtgttc ccattaccca aagcctttaa atccctcatg    900
ctcagtacac cagggcaggt ctagcatttc ttcatttagt gtatgctgtc cattcatgca    960
accacctcag gactcctgga ttctctgcct agttgagctc ctgcatgctg cctccttggg   1020
gaggtgaggg agagggccca tggttcaatg ggatctgtgc agttgtaaca cattaggtgc   1080
ttaataaaca gaagctgtga tgttaaaaaa aaaaaaaaa                           1119
```

```
        <210> 178
        <211> 164
        <212> PRT
        <213> Homo sapien

        <220>
        <221> VARIANT
        <222> (1)...(164)
        <223> Xaa = Any Amino Acid


        <400> 178
Met Glu Asn Glu Leu Phe Cys Ser Gly Val Leu Val His Pro Gln Trp
1               5                   10                  15
Val Leu Ser Ala Ala His Cys Phe Gln Asn Ser Tyr Thr Ile Gly Leu
            20                  25                  30
Gly Leu His Ser Leu Glu Ala Asp Gln Glu Pro Gly Ser Gln Met Val
        35                  40                  45
Glu Ala Ser Leu Ser Val Arg His Pro Glu Tyr Asn Arg Pro Leu Leu
    50                  55                  60
Ala Asn Asp Leu Met Leu Ile Lys Leu Asp Glu Ser Val Ser Glu Ser
65                  70                  75                  80
Asp Thr Ile Arg Ser Ile Ser Ile Ala Ser Gln Cys Pro Thr Ala Gly
                85                  90                  95
Asn Ser Cys Leu Val Ser Gly Trp Gly Leu Leu Ala Asn Asp Ala Val
            100                 105                 110
Ile Ala Ile Gln Ser Xaa Thr Val Gly Gly Trp Glu Cys Glu Lys Leu
        115                 120                 125
Ser Gln Pro Trp Gln Gly Cys Thr Ile Ser Ala Thr Ser Ser Ala Arg
    130                 135                 140
Thr Ser Cys Cys Ile Leu Thr Gly Cys Ser Leu Leu Leu Thr Ala Ser
145                 150                 155                 160
Pro Gly Thr Leu
```

```
        <210> 179
        <211> 250
        <212> DNA
        <213> Homo sapien

        <400> 179
```

```
ctggagtgcc ttggtgtttc aagcccctgc aggaagcaga atgcaccttc tgaggcacct      60
ccagctgccc ccggccgggg gatgcgaggc tcggagcacc cttgcccggc tgtgattgct     120
gccaggcact gttcatctca gcttttctgt ccctttgctc ccggcaagcg cttctgctga     180
aagttcatat ctggagcctg atgtcttaac gaataaaggt cccatgctcc acccgaaaaa     240
aaaaaaaaaa                                                            250
```

```
        <210> 180
        <211> 202
        <212> DNA
        <213> Homo sapien

        <400> 180
actagtccag tgtggtggaa ttccattgtg ttgggcccaa cacaatggct acctttaaca      60
tcacccagac cccgcccctg ccgtgcccc acgctgctgc taacgacagt atgatgctta     120
ctctgctact cggaaactat ttttatgtaa ttaatgtatg ctttcttgtt tataaatgcc     180
tgatttaaaa aaaaaaaaaa aa                                              202
```

```
        <210> 181
        <211> 558
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(558)
        <223> n = A,T,C or G

        <400> 181
tccytttgkt naggtttkkg agacamccck agacctwaan ctgtgtcaca gacttcyngg      60
aatgtttagg cagtgctagt aattttcytcg taatgattct gttattactt tcctnattct     120
ttattcctct ttcttctgaa gattaatgaa gttgaaaatt gaggtggata aatacaaaaa     180
ggtagtgtga tagtataagt atctaagtgc agatgaaagt gtgttatata tatccattca     240
aaattatgca agttagtaat tactcagggt taactaaatt actttaatat gctgttgaac     300
ctactctgtt ccttggctag aaaaaattat aaacaggact ttgttagttt gggaagccaa     360
attgataata ttctatgttc taaagttgg gctatacata aattattaag aaatatggaw     420
ttttattccc aggaatatgg kgttcatttt atgaatatta cscrggatag awgtwtgagt     480
aaaaycagtt ttggtwaata ygtwaatatg tcmtaaataa acaakgctct gacttatttc     540
caaaaaaaaa aaaaaaaa                                                   558
```

```
        <210> 182
        <211> 479
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(479)
        <223> n = A,T,C or G

        <400> 182
acagggwttk grggatgcta agsccccrga rwtygtttga tccaaccctg gcttwttttc      60
agaggggaaa atggggccta gaagttacag mscatytagy tggtgcgmtg gcacccctgg     120
cstcacacag astcccgagt agctgggact acaggcacac agtcactgaa gcaggccctg     180
ttwgcaattc acgttgccac ctccaactta aacattcttc atatgtgatg tccttagtca     240
ctaaggttaa actttcccac ccagaaaagg caacttagat aaaatcttag agtactttca     300
```

```
tactmttcta agtcctcttc cagcctcact kkgagtcctm cytgggggtt gataggaant      360
ntctcttggc tttctcaata aartctctat ycatctcatg tttaatttgg tacgcatara      420
awtgstgara aaattaaaat gttctggtty mactttaaaa araaaaaaaa aaaaaaaaa       479
```

```
        <210> 183
        <211> 384
        <212> DNA
        <213> Homo sapien
```

```
        <400> 183
aggcgggagc agaagctaaa gccaaagccc aagaagagtg gcagtgccag cactggtgcc       60
agtaccagta ccaataacag tgccagtgcc agtgccagca ccagtggtgg cttcagtgct      120
ggtgccagcc tgaccgccac tctcacattt gggctcttcg ctggccttgg tggagctggt      180
gccagcacca gtggcagctc tggtgcctgt ggtttctcct acaagtgaga ttttagatat      240
tgttaatcct gccagtcttt ctcttcaagc cagggtgcat cctcagaaac ctactcaaca      300
cagcactcta ggcagccact atcaatcaat tgaagttgac actctgcatt aratctattt      360
gccatttcaa aaaaaaaaaa aaaa                                            384
```

```
        <210> 184
        <211> 496
        <212> DNA
        <213> Homo sapien
```

```
        <220>
        <221> misc_feature
        <222> (1)...(496)
        <223> n = A,T,C or G
```

```
        <400> 184
accgaattgg gaccgctggc ttataagcga tcatgtyynt ccrgtatkac ctcaacgagc       60
agggagatcg agtctatacg ctgaagaaat ttgacccgat gggacaacag acctgctcag      120
cccatcctgc tcggttctcc ccagatgaca aatactctsg acaccgaatc accatcaaga      180
aacgcttcaa ggtgctcatg acccagcaac cgcgccctgt cctctgaggg tcccttaaac      240
tgatgtcttt tctgccacct gttacccctc ggagactccg taaccaaact cttcggactg      300
tgagccctga tgcctttttg ccagccatac tctttggcat ccagtctctc gtggcgattg      360
attatgcttg tgtgaggcaa tcatggtggc atcacccata aagggaacac atttgacttt      420
tttttctcat atttaaatt actacmagaw tattwmagaw waaatgawtt gaaaaactst      480
taaaaaaaaa aaaaaa                                                     496
```

```
        <210> 185
        <211> 384
        <212> DNA
        <213> Homo sapien
```

```
        <400> 185
gctggtagcc tatggcgkgg cccacggagg ggctcctgag gccacggrac agtgacttcc       60
caagtatcyt gcgcsgcgtc ttctaccgtc cctacctgca gatcttcggg cagattcccc      120
aggaggacat ggacgtggcc ctcatggagc acagcaactg ytcgtcggag cccggcttct      180
gggcacaccc tcctggggcc caggcgggca cctgcgtctc ccagtatgcc aactggctgg      240
tggtgctgct cctcgtcatc ttcctgctcg tggccaacat cctgctggtc aacttgctca      300
ttgccatgtt cagttacaca ttcggcaaag tacagggcaa cagcgatctc tactgggaag      360
gcgcagcgtt accgcctcat ccgg                                            384
```

```
        <210> 186
        <211> 577
```

```
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(577)
        <223> n = A,T,C or G

        <400> 186
gagttagctc ctccacaacc ttgatgaggt cgtctgcagt ggcctctcgc ttcataccgc         60
tnccatcgtc atactgtagg tttgccacca cytcctggca tcttgggggcg gcntaatatt        120
ccaggaaact ctcaatcaag tcaccgtcga tgaaacctgt gggctggttc tgtcttccgc        180
tcggtgtgaa aggatctccc agaaggagtg ctcgatcttc cccacacttt tgatgacttt        240
attgagtcga ttctgcatgt ccagcaggag gttgtaccag ctctctgaca gtgaggtcac        300
cagccctatc atgccgttga mcgtgccgaa garcaccgag ccttgtgtgg gggkkgaagt        360
ctcacccaga ttctgcatta ccagagagcc gtggcaaaag acattgacaa actcgcccag        420
gtggaaaaag amcamctcct ggargtgctn gccgctcctc gtcmgttggt ggcagcgctw        480
tccttttgac acacaaacaa gttaaaggca ttttcagccc ccagaaantt gtcatcatcc        540
aagatntcgc acagcactna tccagttggg attaaat                                  577

        <210> 187
        <211> 534
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(534)
        <223> n = A,T,C or G

        <400> 187
aacatcttcc tgtataatgc tgtgtaatat cgatccgatn ttgtctgstg agaatycatw         60
actkggaaaa gmaacattaa agcctggaca ctggtattaa aattcacaat atgcaacact        120
ttaaacagtg tgtcaatctg ctcccyynac tttgtcatca ccagtctggg aakaagggta        180
tgccctattc acacctgtta aaagggcgct aagcattttt gattcaacat cttttttttt        240
gacacaagtc cgaaaaaagc aaaagtaaac agttatyaat ttgttagcca attcacttttc       300
ttcatgggac agagccatyt gatttaaaaa gcaaattgca taatattgag cttygggagc        360
tgatatttga gcggaagagt agcctttcta cttcaccaga cacaactccc tttcatattg        420
ggatgttnac naaagtwatg tctctwacag atgggatgct tttgtggcaa ttctgttctg        480
aggatctccc agtttattta ccacttgcac aagaaggcgt tttcttcctc aggc              534

        <210> 188
        <211> 761
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(761)
        <223> n = A,T,C or G

        <400> 188
agaaaccagt atctctnaaa acaacctctc ataccttgtg gacctaattt tgtgtgcgtg         60
tgtgtgtgcg cgcatattat atagacaggc acatcttttt tactttgta aaagcttatg        120
cctctttggt atctatatct gtgaaagttt taatgatctg ccataatgtc ttggggacct        180
```

```
ttgtcttctg tgtaaatggt actagagaaa acacctatnt tatgagtcaa tctagttngt      240
tttattcgac atgaaggaaa tttccagatn acaacactna caaactctcc ctkgackarg      300
ggggacaaag aaaagcaaaa ctgamcataa raaacaatwa cctggtgaga arttgcataa      360
acagaaatwr ggtagtatat tgaarnacag catcattaaa rmgttwtktt wttctccctt      420
gcaaaaaaca tgtacngact tcccgttgag taatgccaag ttgttttttt tatnataaaa      480
cttgcccttc attacatgtt tnaaagtggt gtggtgggcc aaaatattga aatgatggaa      540
ctgactgata aagctgtaca aataagcagt gtgcctaaca agcaacacag taatgttgac      600
atgcttaatt cacaaatgct aatttcatta taaatgtttg ctaaaataca ctttgaacta      660
ttttttctgtn ttcccagagc tgagatntta gattttatgt agtatnaagt gaaaaantac    720
gaaaataata acattgaaga aaaananaaa aaanaaaaaa a                          761
```

       <210> 189
       <211> 482
       <212> DNA
       <213> Homo sapien

       <220>
       <221> misc_feature
       <222> (1)...(482)
       <223> n = A,T,C or G

       <400> 189
```
tttttttttt tttgccgatn ctactatttt attgcaggan gtgggggtgt atgcaccgca       60
caccggggct atnagaagca agaaggaagg agggagggca cagccccttg ctgagcaaca      120
aagccgcctg ctgccttctc tgtctgtctc ctggtgcagg cacatgggga gaccttcccc      180
aaggcagggg ccaccagtcc aggggtggga atacagggg tgggangtgt gcataagaag       240
tgataggcac aggccacccg gtacagaccc ctcggctcct gacaggtnga tttcgaccag      300
gtcattgtgc cctgcccagg cacagcgtan atctggaaaa gacagaatgc tttccttttc      360
aaatttggct ngtcatngaa ngggcanttt tccaanttng gctnggtctt ggtacncttg      420
gttcggccca gctccncgtc caaaaantat tcacccnnct ccnaattgct tgcnggnccc      480
cc                                                                      482
```

       <210> 190
       <211> 471
       <212> DNA
       <213> Homo sapien

       <220>
       <221> misc_feature
       <222> (1)...(471)
       <223> n = A,T,C or G

       <400> 190
```
tttttttttt ttttaaaaca gttttttcaca acaaaattta ttagaagaat agtggttttg       60
aaaactctcg catccagtga gaactaccat acaccacatt acagctngga atgtnctcca      120
aatgtctggt caaatgatac aatggaacca ttcaatctta cacatgcacg aaagaacaag      180
cgcttttgac atacaatgca caaaaaaaaa agggggggggg gaccacatgg attaaaattt      240
taagtactca tcacatacat taagacacag ttctagtcca gtcnaaaatc agaactgcnt      300
tgaaaaattt catgtatgca atccaaccaa agaacttnat tggtgatcat gantnctcta      360
ctacatcnac cttgatcatt gccaggaacn aaaagttnaa ancacncngt acaaaaanaa      420
tctgtaattn anttcaacct ccgtacngaa aaatnttnnt tatacactcc c              471
```

       <210> 191
       <211> 402
       <212> DNA

```
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(402)
        <223> n = A,T,C or G

        <400> 191
gagggattga aggtctgttc tastgtcggm ctgttcagcc accaactcta acaagttgct       60
gtcttccact cactgtctgt aagcttttta acccagacwg tatcttcata aatagaacaa      120
attcttcacc agtcacatct tctaggacct ttttggattc agttagtata agctcttcca      180
cttcctttgt taagacttca tctggtaaag tcttaagttt tgtagaaagg aattyaattg      240
ctcgttctct aacaatgtcc tctccttgaa gtatttggct gaacaaccca cctaaagtcc      300
ctttgtgcat ccattttaaa tatacttaat agggcattgk tncactaggt taaattctgc      360
aagagtcatc tgtctgcaaa agttgcgtta gtatatctgc ca                        402

        <210> 192
        <211> 601
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(601)
        <223> n = A,T,C or G

        <400> 192
gagctcggat ccaataatct ttgtctgagg gcagcacaca tatncagtgc catggnaact       60
ggtctacccc acatgggagc agcatgccgt agntatataa ggtcattccc tgagtcagac      120
atgcytyttt gaytaccgtg tgccaagtgc tggtgattct yaacacacyt ccatcccgyt      180
cttttgtgga aaaactggca cttktctgga actagcarga catcacttac aaattcaccc      240
acgagacact tgaaaggtgt aacaaagcga ytcttgcatt gcttttgtc cctccggcac      300
cagttgtcaa tactaacccg ctggtttgcc tccatcacat ttgtgatctg tagctctgga      360
tacatctcct gacagtactg aagaacttct tcttttgttt caaaagcarc tcttggtgcc      420
tgttggatca ggttcccatt tcccagtcyg aatgttcaca tggcatattt wacttcccac      480
aaaacattgc gatttgaggc tcagcaacag caaatcctgt tccggcattg gctgcaagag      540
cctcgatgta gccggccagc gccaaggcag gcgccgtgag ccccacagc agcagaagca      600
g                                                                       601

        <210> 193
        <211> 608
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(608)
        <223> n = A,T,C or G

        <400> 193
atacagccca natcccacca cgaagatgcg cttgttgact gagaacctga tgcggtcact       60
ggtcccgctg tagccccagc gactctccac ctgctggaag cggttgatgc tgcactcytt      120
cccaacgcag gcagmagcgg gsccggtcaa tgaactccay tcgtggcttg gggtkgacgg      180
tkaagtgcag gaagaggctg accacctcgc ggtccaocag gatgcccgac tgtgcgggac      240
ctgcagcgaa actcctcgat ggtcatgagc gggaagcgaa tgaggcccag ggccttgccc      300
```

```
agaaccttcc gcctgttctc tggcgtcacc tgcagctgct gccgctgaca ctcggcctcg    360
gaccagcgga caaacggcrt tgaacagccg cacctcacgg atgcccagtg tgtcgcgctc    420
caggammgsc accagcgtgt ccaggtcaat gtcggtgaag ccctccgcgg gtratggcgt    480
ctgcagtgtt tttgtcgatg ttctccaggc acaggctggc cagctgcggt tcatcgaaga    540
gtcgcgcctg cgtgagcagc atgaaggcgt tgtcggctcg cagttcttct tcaggaactc    600
cacgcaat                                                             608
```

        `<210> 194`
        `<211> 392`
        `<212> DNA`
        `<213> Homo sapien`

        `<220>`
        `<221> misc_feature`
        `<222> (1)...(392)`
        `<223> n = A,T,C or G`

        `<400> 194`
```
gaacggctgg accttgcctc gcattgtgct tgctggcagg gaataccttg gcaagcagyt    60
ccagtccgag cagccccaga ccgctgccgc ccgaagctaa gcctgcctct ggccttcccc    120
tccgcctcaa tgcagaacca gtagtgggag cactgtgttt agagttaaga gtgaacactg    180
tttgatttta cttgggaatt tcctctgtta tatagctttt cccaatgcta atttccaaac    240
aacaacaaca aaataacatg tttgcctgtt aagttgtata aaagtaggtg attctgtatt    300
taaagaaaat attactgtta catatactgc ttgcaatttc tgtatttatt gktnctstgg    360
aaataaatat agttattaaa ggttgtcant cc                                  392
```

        `<210> 195`
        `<211> 502`
        `<212> DNA`
        `<213> Homo sapien`

        `<220>`
        `<221> misc_feature`
        `<222> (1)...(502)`
        `<223> n = A,T,C or G`

        `<400> 195`
```
ccsttkgagg ggtkaggkyc cagttyccga gtggaagaaa caggccagga gaagtgcgtg    60
ccgagctgag gcagatgttc ccacagtgac ccccagagcc stgggstata gtytctgacc    120
cctcncaagg aaagaccacs ttctggggac atgggctgga gggcaggacc tagaggcacc    180
aagggaaggc cccattccgg ggstgttccc cgaggaggaa gggaaggggc tctgtgtgcc    240
ccccasgagg aagaggccct gagtcctggg atcagacacc ccttcacgtg tatccccaca    300
caaatgcaag ctcaccaagg tcccctctca gtccccttcc stacaccctg amcggccact    360
gscscacacc cacccagagc acgccacccg ccatggggar tgtgctcaag gartcgcngg    420
gcarcgtgga catctngtcc cagaaggggg cagaatctcc aatagangga ctgarcmstt    480
gctnanaaaa aaaaanaaaa aa                                             502
```

        `<210> 196`
        `<211> 665`
        `<212> DNA`
        `<213> Homo sapien`

        `<220>`
        `<221> misc_feature`
        `<222> (1)...(665)`

<223> n = A,T,C or G

<400> 196

```
ggttacttgg tttcattgcc accacttagt ggatgtcatt tagaaccatt ttgtctgctc      60
cctctggaag ccttgcgcag agcggacttt gtaattgttg gagaataact gctgaatttt     120
wagctgtttk gagttgatts gcaccactgc acccacaact tcaatatgaa aacyawttga     180
actwatttat tatcttgtga aaagtataac aatgaaaatt ttgttcatac tgtattkatc     240
aagtatgatg aaaagcaawa gatatatatt cttttattat gttaaattat gattgccatt     300
attaatcggc aaaatgtgga gtgtatgttc ttttcacagt aatatatgcc ttttgtaact     360
tcacttggtt attttattgt aaatgartta caaaattctt aatttaagar aatggtatgt     420
watatttatt tcattaattt ctttcctkgt ttacgtwaat tttgaaaaga wtgcatgatt     480
tcttgacaga aatcgatctt gatgctgtgg aagtagtttg acccacatcc ctatgagttt     540
ttcttagaat gtataaaggt tgtagcccat cnaacttcaa agaaaaaaat gaccacatac     600
tttgcaatca ggctgaaatg tggcatgctn ttctaattcc aactttataa actagcaaan     660
aagtg                                                                 665
```

<210> 197
<211> 492
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(492)
<223> n = A,T,C or G

<400> 197

```
ttttnttttt ttttttttgc aggaaggatt ccatttattg tggatgcatt ttcacaatat      60
atgtttattg gagcgatcca ttatcagtga aaagtatcaa gtgtttataa natttttagg     120
aaggcagatt cacagaacat gctngtcngc ttgcagtttt acctcgtana gatnacagag     180
aattatagtc naaccagtaa acnaggaatt tacttttcaa aagattaaat ccaaactgaa     240
caaaattcta ccctgaaact tactccatcc aaatattgga ataanagtca gcagtgatac     300
attctcttct gaactttaga tttttctagaa aaatatgtaa tagtgatcag gaagagctct     360
tgttcaaaag tacaacnaag caatgttccc ttaccatagg ccttaattca aacttttgatc     420
catttcactc ccatcacggg agtcaatgct acctgggaca cttgtatttt gttcatnctg     480
ancntggctt aa                                                         492
```

<210> 198
<211> 478
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(478)
<223> n = A,T,C or G

<400> 198

```
tttntttgn atttcantct gtannaanta ttttcattat gtttattana aaaatatnaa      60
tgtntccacn acaaatcatn ttacntnagt aagaggccan ctacattgta caacatacac     120
tgagtatatt ttgaaaagga caagtttaaa gtanacncat attgccganc atancacatt     180
tatacatggc ttgattgata tttagcacag canaaactga gtgagttacc agaaanaaat     240
natatatgtc aatcngattt aagatacaaa acagatccta tggtacatan catcntgtag     300
gagttgtggc tttatgttta ctgaaagtca atgcagttcc tgtacaaaga gatggccgta     360
agcattctag tacctctact ccatggttaa gaatcgtaca cttatgttta catatgtnca     420
```

```
gggtaagaat tgtgttaagt naanttatgg agaggtccan gagaaaaatt tgatncaa          478
```

```
        <210> 199
        <211> 482
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(482)
        <223> n = A,T,C or G

        <400> 199
agtgacttgt cctccaacaa aaccccttga tcaagtttgt ggcactgaca atcagaccta          60
tgctagttcc tgtcatctat tcgctactaa atgcagactg gaggggacca aaaaggggca         120
tcaactccag ctggattatt ttggagcctg caaatctatt cctacttgta cggactttga         180
agtgattcag tttcctctac ggatgagaga ctggctcaag aatatcctca tgcagcttta         240
tgaagccnac tctgaacacg ctggttatct nagatgagaa ncagagaaat aaagtcnaga         300
aaatttacct ggangaaaag aggctttngg ctggggacca tcccattgaa ccttctctta         360
anggacttta agaanaaact accacatgtn tgtngtatcc tggtgccngg ccgtttantg         420
aacntngacn ncacccttnt ggaatanant cttgacngcn tcctgaactt gctcctctgc         480
ga                                                                         482
```

```
        <210> 200
        <211> 270
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(270)
        <223> n = A,T,C or G

        <400> 200
cggccgcaag tgcaactcca gctggggccg tgcggacgaa gattctgcca gcagttggtc          60
cgactgcgac gacggcggcg gcgacagtcg caggtgcagc gcgggcgcct ggggtcttgc         120
aaggctgagc tgacgccgca gaggtcgtgt cacgtcccac gaccttgacg ccgtcgggga         180
cagccggaac agagcccggt gaangcggga ggcctcgggg agcccctcgg gaagggcggc         240
ccgagagata cgcaggtgca ggtggccgcc                                          270
```

```
        <210> 201
        <211> 419
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(419)
        <223> n = A,T,C or G

        <400> 201
tttttttttt ttttggaatc tactgcgagc acagcaggtc agcaacaagt ttattttgca          60
gctagcaagg taacagggta gggcatggtt acatgttcag gtcaacttcc tttgtcgtgg         120
ttgattggtt tgtctttatg ggggcggggt ggggtagggg aaancgaagc anaantaaca         180
tggagtgggt gcaccctccc tgtagaacct ggttacnaaa gcttggggca gttcacctgg         240
```

```
tctgtgaccg tcattttctt gacatcaatg ttattagaag tcaggatatc ttttagagag      300
tccactgtnt ctggagggag attagggttt cttgccaana tccaancaaa atccacntga      360
aaaagttgga tgatncangt acngaatacc ganggcatan ttctcatant cggtggcca       419
```

        <210> 202
        <211> 509
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(509)
        <223> n = A,T,C or G

        <400> 202

```
tttntttttt ttttttttt tttttttttt tttttttttt ttttttttt ttttttttt       60
tggcacttaa tccattttta tttcaaaatg tctacaaant ttnaatncnc cattatacng      120
gtnattttnc aaaatctaaa nnttattcaa atntnagcca aantccttac ncaaatnnaa      180
tacncncaaa aatcaaaaat atacntntct ttcagcaaac ttngttacat aaattaaaaa      240
aatatatacg gctggtgttt tcaaagtaca attatcttaa cactgcaaac atntttnnaa      300
ggaactaaaa taaaaaaaaa cactnccgca aaggttaaag ggaacaacaa attcntttta      360
caacancnnc nattataaaa atcatatctc aaatcttagg ggaatatata cttcacacng      420
ggatcttaac ttttactnca ctttgtttat ttttttanaa ccattgtntt gggcccaaca      480
caatggnaat nccnccncnc tggactagt                                        509
```

        <210> 203
        <211> 583
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(583)
        <223> n = A,T,C or G

        <400> 203

```
ttttttttt ttttttttga ccccctctt ataaaaaca agttaccatt ttatttact         60
tacacatatt tattttataa ttggtattag atattcaaaa ggcagctttt aaaatcaaac      120
taaatggaaa ctgccttaga tacataattc ttaggaatta gcttaaaatc tgcctaaagt      180
gaaaatcttc tctagctctt ttgactgtaa atttttgact cttgtaaaac atccaaattc      240
attttcttg tctttaaaat tatctaatct ttccattttt tccctattcc aagtcaattt      300
gcttctctag cctcatttcc tagctcttat ctactattag taagtggctt ttttcctaaa     360
agggaaaaca ggaagagana atggcacaca aaacaaacat tttatattca tatttctacc      420
tacgttaata aaatagcatt ttgtgaagcc agctcaaaag aaggcttaga tccttttatg     480
tccattttag tcactaaacg atatcnaaag tgccagaatg caaaaggttt gtgaacattt      540
attcaaaagc taatataaga tatttcacat actcatcttt ctg                        583
```

        <210> 204
        <211> 589
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(589)
```

<223> n = A,T,C or G

<400> 204

```
tttttttttnt tttttttttt tttttnctc ttctttttttt ttganaatga ggatcgagtt      60
tttcactctc tagatagggc atgaagaaaa ctcatctttc cagctttaaa ataacaatca      120
aatctcttat gctatatcat attttaagtt aaactaatga gtcactggct tatcttctcc      180
tgaaggaaat ctgttcattc ttctcattca tatagttata tcaagtacta ccttgcatat      240
tgagaggttt ttcttctcta tttacacata tatttccatg tgaatttgta tcaaaccttt      300
attttcatgc aaactagaaa ataatgtntt cttttgcata agagaagaga acaatatnag      360
cattacaaaa ctgctcaaat tgtttgttaa gnttatccat tataattagt tnggcaggag      420
ctaatacaaa tcacatttac ngacnagcaa taataaaact gaagtaccag ttaaatatcc      480
aaaataatta aaggaacatt tttagcctgg gtataattag ctaattcact ttacaagcat      540
ttattnagaa tgaattcaca tgttattatt ccntagccca acacaatgg                  589
```

<210> 205
<211> 545
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(545)
<223> n = A,T,C or G

<400> 205

```
tttttntttt tttttcagt aataatcaga acaatattta ttttatatt taaaattcat        60
agaaaagtgc cttacattta ataaagttt gtttctcaaa gtgatcagag gaattagata       120
tngtcttgaa caccaatatt aatttgagga aaatacacca aaatacatta agtaaattat      180
ttaagatcat agagcttgta agtgaaaaga taaaatttga cctcagaaac tctgagcatt      240
aaaaatccac tattagcaaa taaattacta tggacttctt gctttaattt tgtgatgaat      300
atggggtgtc actggtaaac caacacattc tgaaggatac attacttagt gatagattct      360
tatgtacttt gctanatnac gtggatatga gttgacaagt ttctctttct tcaatctttt      420
aaggggcnga ngaaatgagg aagaaaagaa aaggattacg catactgttc tttctatngg      480
aaggattaga tatgtttcct ttgccaatat taaaaaaata ataatgttta ctactagtga      540
aaccc                                                                  545
```

<210> 206
<211> 487
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(487)
<223> n = A,T,C or G

<400> 206

```
tttttttttt tttttagtc aagtttctna ttttattat aattaaagtc ttggtcattt        60
catttattag ctctgcaact tacatattta aattaaagaa acgttnttag acaactgtna      120
caatttataa atgtaaggtg ccattattga gtanatatat tcctccaaga gtggatgtgt      180
cccttctccc accaactaat gaancagcaa cattagttta attttattag tagatnatac      240
actgctgcaa acgctaattc tcttctccat ccccatgtng atattgtgta tatgtgtgag      300
ttggtnagaa tgcatcanca atctnacaat caacagcaag atgaagctag gcntgggctt      360
tcggtgaaaa tagactgtgt ctgtctgaat caaatgatct gacctatcct cggtggcaag      420
aactcttcga accgcttcct caaaggcngc tgccacattt gtggcntctn ttgcacttgt      480
```

ttcaaaa   487

          <210> 207
          <211> 332
          <212> DNA
          <213> Homo sapien

          <220>
          <221> misc_feature
          <222> (1)...(332)
          <223> n = A,T,C or G

          <400> 207
tgaattggct aaaagactgc attttttanaa ctagcaactc ttatttctttt cctttaaaaa   60
tacatagcat taaatcccaa atcctattta aagacctgac agcttgagaa ggtcactact   120
gcatttatag gaccttctgg tggttctgct gttacntttg aantctgaca atccttgana   180
atctttgcat gcagaggagg taaaaggtat tggattttca cagaggaana acacagcgca   240
gaaatgaagg ggccaggctt actgagcttg tccactggag ggctcatggg tgggacatgg   300
aaaagaaggc agcctaggcc ctggggagcc ca   332

          <210> 208
          <211> 524
          <212> DNA
          <213> Homo sapien

          <220>
          <221> misc_feature
          <222> (1)...(524)
          <223> n = A,T,C or G

          <400> 208
agggcgtggt gcggagggcg ttactgtttt gtctcagtaa caataaatac aaaaagactg   60
gttgtgttcc ggccccatcc aaccacgaag ttgattctc ttgtgtgcag agtgactgat   120
tttaaaggac atggagcttg tcacaatgtc acaatgtcac agtgtgaagg gcacactcac   180
tcccgcgtga ttcacattta gcaaccaaca atagctcatg agtccatact tgtaaatact   240
tttggcagaa tacttnttga aacttgcaga tgataactaa gatccaagat atttcccaaa   300
gtaaatagaa gtgggtcata atattaatta cctgttcaca tcagcttcca tttacaagtc   360
atgagcccag acactgacat caaactaagc ccacttagac tcctcaccac cagtctgtcc   420
tgtcatcaga caggaggctg tcaccttgac caaattctca ccagtcaatc atctatccaa   480
aaaccattac ctgatccact tccggtaatg caccaccttg gtga   524

          <210> 209
          <211> 159
          <212> DNA
          <213> Homo sapien

          <400> 209
gggtgaggaa atccagagtt gccatggaga aaattccagt gtcagcattc ttgctccttg   60
tggccctctc ctacactctg gcagagata ccacagtcaa acctggagcc aaaaaggaca   120
caaaggactc tcgacccaaa ctgccccaga ccctctcca   159

          <210> 210
          <211> 256
          <212> DNA
          <213> Homo sapien

```
        <220>
        <221> misc_feature
        <222> (1)...(256)
        <223> n = A,T,C or G

        <400> 210
actccctggc agacaaaggc agaggagaga gctctgttag ttctgtgttg ttgaactgcc    60
actgaatttc tttccacttg gactattaca tgccanttga gggactaatg gaaaaacgta   120
tggggagatt ttanccaatt tangtntgta aatggggaga ctggggcagg cgggagagat   180
ttgcagggtg naaatgggan ggctggtttg ttanatgaac agggacatag gaggtaggca   240
ccaggatgct aaatca                                                    256


        <210> 211
        <211> 264
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(264)
        <223> n = A,T,C or G

        <400> 211
acattgtttt tttgagataa agcattgaga gagctctcct taacgtgaca caatggaagg    60
actggaacac atacccacat ctttgttctg agggataatt ttctgataaa gtcttgctgt   120
atattcaagc acatatgtta tatattattc agttccatgt ttatagccta gttaaggaga   180
ggggagatac attcngaaag aggactgaaa gaaatactca agtnggaaaa cagaaaaaga   240
aaaaaggag caaatgagaa gcct                                           264


        <210> 212
        <211> 328
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(328)
        <223> n = A,T,C or G

        <400> 212
acccaaaaat ccaatgctga atatttggct tcattattcc canattcttt gattgtcaaa    60
ggatttaatg ttgtctcagc ttgggcactt cagttaggac ctaaggatgc cagccggcag   120
gtttatatat gcagcaacaa tattcaagcg cgacaacagg ttattgaact tgcccgccag   180
ttnaatttca ttcccattga cttgggatcc ttatcatcag ccagagagat tgaaaattta   240
cccctacnac tctttactct ctgganaggg ccagtggtgg tagctataag cttggccaca   300
ttttttttc ctttattcct tgtcaga                                        328


        <210> 213
        <211> 250
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
```

```
<222> (1)...(250)
<223> n = A,T,C or G

<400> 213
acttatgagc agagcgacat atccnagtgt agactgaata aaactgaatt ctctccagtt         60
taaagcattg ctcactgaag ggatagaagt gactgccagg agggaaagta agccaaggct        120
cattatgcca aagganatat acatttcaat tctccaaact tcttcctcat tccaagagtt        180
ttcaatattt gcatgaacct gctgataanc catgttaana aacaaatatc tctctnacct        240
tctcatcggt                                                               250


        <210> 214
        <211> 444
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(444)
        <223> n = A,T,C or G

        <400> 214
acccagaatc caatgctgaa tatttggctt cattattccc agattctttg attgtcaaag         60
gatttaatgt tgtctcagct tgggcacttc agttaggacc taaggatgcc agccggcagg        120
tttatatatg cagcaacaat attcaagcgc gacaacaggt tattgaactt gcccgccagt        180
tgaatttcat tcccattgac ttgggatcct tatcatcagc canagagatt gaaaatttac        240
ccctacgact ctttactctc tggagagggc cagtggtggt agctataagc ttggccacat        300
ttttttttcc tttattcctt tgtcagagat gcgattcatc catatgctan aaaccaacag        360
agtgactttt acaaaattcc tataganatt gtgaataaaa ccttacctat agttgccatt        420
actttgctct ccctaatata cctc                                               444


        <210> 215
        <211> 366
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(366)
        <223> n = A,T,C or G

        <400> 215
acttatgagc agagcgacat atccaagtgt anactgaata aaactgaatt ctctccagtt         60
taaagcattg ctcactgaag ggatagaagt gactgccagg agggaaagta agccaaggct        120
cattatgcca aagganatat acatttcaat tctccaaact tcttcctcat tccaagagtt        180
ttcaatattt gcatgaacct gctgataagc catgttgaga aacaaatatc tctctgacct        240
tctcatcggt aagcagaggc tgtaggcaac atggaccata gcgaanaaaa aacttagtaa        300
tccaagctgt tttctacact gtaaccaggt ttccaaccaa ggtggaaatc tcctatactt        360
ggtgcc                                                                   366


        <210> 216
        <211> 260
        <212> DNA
        <213> Homo sapien

        <220>
```

```
        <221> misc_feature
        <222> (1)...(260)
        <223> n = A,T,C or G


        <400> 216
ctgtataaac agaactccac tgcangaggg agggccgggc caggagaatc tccgcttgtc       60
caagacaggg gcctaaggag ggtctccaca ctgctnntaa gggctnttnc attttttttat     120
taataaaaag tnnaaaaggc ctcttctcaa cttttttccc ttnggctgga aaatttaaaa      180
atcaaaaatt tcctnaagtt ntcaagctat catatatact ntatcctgaa aaagcaacat      240
aattcttcct tccctccttt                                                  260


        <210> 217
        <211> 262
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(262)
        <223> n = A,T,C or G


        <400> 217
acctacgtgg gtaagtttan aaatgttata atttcaggaa naggaacgca tataattgta       60
tcttgcctat aattttctat tttaataagg aaatagcaaa ttggggtggg gggaatgtag      120
ggcattctac agtttgagca aaatgcaatt aaatgtggaa ggacagcact gaaaaatttt      180
atgaataatc tgtatgatta tatgtctcta gagtagattt ataattagcc acttacccta      240
atatccttca tgcttgtaaa gt                                               262


        <210> 218
        <211> 205
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(205)
        <223> n = A,T,C or G


        <400> 218
accaaggtgg tgcattaccg gaantggatc aangacacca tcgtggccaa cccctgagca       60
cccctatcaa ctcccttttg tagtaaactt ggaaccttgg aaatgaccag gccaagactc      120
aggcctcccc agttctactg acctttgtcc ttangtntna ngtccagggt tgctaggaaa      180
anaaatcagc agacacaggt gtaaa                                            205


        <210> 219
        <211> 114
        <212> DNA
        <213> Homo sapien


        <400> 219
tactgttttg tctcagtaac aataaataca aaaagactgg ttgtgttccg gccccatcca       60
accacgaagt tgatttctct tgtgtgcaga gtgactgatt ttaaaggaca tgga            114


        <210> 220
        <211> 93
```

```
        <212> DNA
        <213> Homo sapien

        <400> 220
actagccagc acaaaaggca gggtagcctg aattgctttc tgctctttac atttctttta        60
aaataagcat ttagtgctca gtccctactg agt                                     93

        <210> 221
        <211> 167
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(167)
        <223> n = A,T,C or G

        <400> 221
actangtgca ggtgcgcaca aatatttgtc gatattccct tcatcttgga ttccatgagg        60
tcttttgccc agcctgtggc tctactgtag taagtttctg ctgatgagga gccagnatgc       120
cccccactac cttccctgac gctccccana aatcacccaa cctctgt                     167

        <210> 222
        <211> 351
        <212> DNA
        <213> Homo sapien

        <400> 222
agggcgtggt gcggagggcg gtactgacct cattagtagg aggatgcatt ctggcacccc        60
gttcttcacc tgtcccccaa tccttaaaag gccatactgc ataaagtcaa caacagataa       120
atgtttgctg aattaaagga tggatgaaaa aaattaataa tgaatttttg cataatccaa       180
ttttctcttt tatatttcta gaagaagttt ctttgagcct attagatccc gggaatcttt       240
taggtgagca tgattagaga gcttgtaggt tgcttttaca tatatctggc atatttgagt       300
ctcgtatcaa aacaatagat tggtaaaggt ggtattattg tattgataag t               351

        <210> 223
        <211> 383
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(383)
        <223> n = A,T,C or G

        <400> 223
aaaacaaaca aacaaaaaaa acaattcttc attcagaaaa attatcttag ggactgatat        60
tggtaattat ggtcaattta atwrtrttkt ggggcatttc cttacattgt cttgacaaga       120
ttaaaatgtc tgtgccaaaa ttttgtattt tatttggaga cttcttatca aaagtaatgc       180
tgccaaagga agtctaagga attagtagtg ttcccmtcac ttgtttggag tgtgctattc       240
taaaagattt tgattcctg gaatgacaat tatattttaa ctttggtggg ggaaanagtt        300
ataggaccac agtcttcact tctgatactt gtaaattaat cttttattgc acttgttttg       360
accattaagc tatatgttta aaa                                               383

        <210> 224
```

```
<211> 320
<212> DNA
<213> Homo sapien

<400> 224
cccctgaagg cttcttgtta gaaaatagta cagttacaac caataggaac aacaaaaaga        60
aaaagtttgt gacattgtag tagggagtgt gtacccctta ctccccatca aaaaaaaaat       120
ggatacatgg ttaaaggata raagggcaat attttatcat atgttctaaa agagaaggaa       180
gagaaaatac tactttctcr aaatggaagc ccttaaaggt gctttgatac tgaaggacac       240
aaatgtggcc gtccatcctc ctttaragtt gcatgacttg dacacggtaa ctgttgcagt       300
tttaractcm gcattgtgac                                                    320


<210> 225
<211> 1214
<212> DNA
<213> Homo sapien

<400> 225
gaggactgca gcccgcactc gcagccctgg caggcggcac tggtcatgga aaacgaattg        60
ttctgctcgg gcgtcctggt gcatccgcag tgggtgctgt cagccgcaca ctgtttccag       120
aactcctaca ccatcgggct gggcctgcac agtcttgagg ccgaccaaga gccagggagc       180
cagatggtgg aggccagcct ctccgtacgg cacccagagt acaacagacc cttgctcgct       240
aacgacctca tgctcatcaa gttggacgaa tccgtgtccg agtctgacac catccggagc       300
atcagcattg cttcgcagtg ccctaccgcg gggaactctt gcctcgtttc tggctggggt       360
ctgctggcga acggcagaat gcctaccgtg ctgcagtgcg tgaacgtgtc ggtggtgtct       420
gaggaggtct gcagtaagct ctatgacccg ctgtaccacc ccagcatgtt ctgcgccggc       480
ggagggcaag accagaagga ctcctgcaac ggtgactctg gggggcccct gatctgcaac       540
gggtacttgc agggccttgt gtctttcgga aaagccccgt gtggccaagt tggcgtgcca       600
ggtgtctaca ccaacctctg caaattcact gagtggatag agaaaaccgt ccaggccagt       660
taactctggg gactgggaac ccatgaaatt gaccccaaa tacatcctgc ggaaggaatt       720
caggaatatc tgttcccagc ccctcctccc tcaggcccag gagtccaggc ccccagcccc       780
tcctccctca aaccaagggt acagatcccc agccctcct ccctcagacc caggagtcca       840
gaccccccag cccctcctcc ctcagaccca ggagtccagc ccctcctccc tcagacccag       900
gagtccagac cccccagccc ctcctccctc agacccaggg gtccaggccc caacccctc       960
ctccctcaga ctcagaggtc caagccccca accctccctt ccccagaccc agaggtccag      1020
gtcccagccc ctcctccctc agaccagcg gtccaatgcc acctagactc tccctgtaca      1080
cagtgccccc ttgtggcacg ttgacccaac cttaccagtt ggttttttcat tttttgtccc      1140
tttcccctag atccagaaat aaagtctaag agaagcgcaa aaaaaaaaa aaaaaaaaa       1200
aaaaaaaaa aaaa                                                         1214


<210> 226
<211> 119
<212> DNA
<213> Homo sapien

<400> 226
acccagtatg tgcagggaga cggaacccca tgtgacagcc cactccacca gggttcccaa        60
agaacctggc ccagtcataa tcattcatcc tgacagtggc aataatcacg ataaccagt        119


<210> 227
<211> 818
<212> DNA
<213> Homo sapien

<400> 227
```

```
acaattcata gggacgacca atgaggacag ggaatgaacc cggctctccc ccagccctga     60
tttttgctac atatggggtc ccttttcatt ctttgcaaaa acactgggtt ttctgagaac    120
acggacggtt cttagcacaa tttgtgaaat ctgtgtaraa ccgggctttg caggggagat    180
aattttcctc ctctggagga aaggtggtga ttgacaggca gggagacagt gacaaggcta    240
gagaaagcca cgctcggcct tctctgaacc aggatggaac ggcagacccc tgaaaacgaa    300
gcttgtcccc ttccaatcag ccacttctga gaacccccat ctaacttcct actggaaaag    360
agggcctcct caggagcagt ccaagagttt tcaaagataa cgtgacaact accatctaga    420
ggaaagggtg caccctcagc agagaagccg agagcttaac tctggtcgtt tccagagaca    480
acctgctggc tgtcttggga tgcgcccagc ctttgagagg ccactacccc atgaacttct    540
gccatccact ggacatgaag ctgaggacac tgggcttcaa cactgagttg tcatgagagg    600
gacaggctct gccctcaagc cggctgaggg cagcaaccac tctcctcccc tttctcacgc    660
aaagccattc ccacaaatcc agaccatacc atgaagcaac gagacccaaa cagtttggct    720
caagaggata tgaggactgt ctcagcctgg ctttgggctg acaccatgca cacacacaag    780
gtccacttct aggttttcag cctagatggg agtcgtgt                           818
```

```
        <210> 228
        <211> 744
        <212> DNA
        <213> Homo sapien


        <400> 228
actggagaca ctgttgaact tgatcaagac ccagaccacc ccaggtctcc ttcgtgggat     60
gtcatgacgt ttgacatacc tttggaacga gcctcctcct tggaagatgg aagaccgtgt    120
tcgtggccga cctggcctct cctggcctgt ttcttaagat gcggagtcac atttcaatgg    180
taggaaaagt ggcttcgtaa aatagaagag cagtcactgt ggaactacca aatggcgaga    240
tgctcggtgc acattggggt gctttgggat aaaagattta tgagccaact attctctggc    300
accagattct aggccagttt gttccactga agcttttccc acagcagtcc acctctgcag    360
gctggcagct gaatggcttg ccggtggctc tgtggcaaga tcacactgag atcgatgggt    420
gagaaggcta ggatgcttgt ctagtgttct tagctgtcac gttggctcct tccaggttgg    480
ccagacggtg ttggccactc ccttctaaaa cacaggcgcc ctcctggtga cagtgacccg    540
ccgtggtatg ccttggccca ttccagcagt cccagttatg catttcaagt ttggggtttg    600
ttcttttcgt taatgttcct ctgtgttgtc agctgtcttc atttcctggg ctaagcagca    660
ttgggagatg tggaccagag atccactcct taagaaccag tggcgaaaga cacttctctt    720
cttcactctg aagtagctgg tggt                                          744
```

```
        <210> 229
        <211> 300
        <212> DNA
        <213> Homo sapien


        <400> 229
cgagtctggg ttttgtctat aaagttcgat ccctcctttt ctcatccaaa tcatgtgaac     60
cattacacat cgaaataaaa gaaaggtggc agacttgccc aacgccaggc tgacatgtgc    120
tgcagggttg ttgttttta attattattg ttagaaacgt cacccacagt ccctgttaat    180
ttgtatgtga cagccaactc tgagaaggtc ctattttctcc acctgcagag gatccagtct    240
cactaggctc ctccttgccc tcacactgga gtctccgcca gtgtgggtgc ccactgacat    300
```

```
        <210> 230
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 230
cagcagaaca aatacaaata tgaagagtgc aaagatctca taaaatctat gctgaggaat     60
gagcgacagt tcaaggagga gaagcttgca gagcagctca agcaagctga ggagctcagg    120
```

```
caatataaag tcctggttca cactcaggaa cgagagctga cccagttaag ggagaagttg      180
cgggaaggga gagatgcctc cctctcattg aatgagcatc tccaggccct cctcactccg      240
gatgaaccgg acaagtccca ggggcaggac ctccaagaaa cagacctcgg ccgcgaccac      300
g                                                                      301
```

        <210> 231
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 231

```
gcaagcacgc tggcaaatct ctgtcaggtc agctccagag aagccattag tcattttagc       60
caggaactcc aagtccacat ccttggcaac tggggacttg cgcaggttag ccttgaggat      120
ggcaacacgg gacttctcat caggaagtgg gatgtagatg agctgatcaa gacggccagg      180
tctgaggatg gcaggatcaa tgatgtcagg ccggttggta ccgccaatga tgaacacatt      240
ttttttgtg gacatgccat ccattctgt caggatctgg ttgatgactc ggtcagcagc      300
c                                                                      301
```

        <210> 232
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 232

```
agtaggtatt tcgtgagaag ttcaacacca aaactggaac atagttctcc ttcaagtgtt       60
ggcgacagcg gggcttcctg attctggaat ataacttgt gtaaattaac agccacctat      120
agaagagtcc atctgctgtg aaggagagac agagaactct gggttccgtc gtcctgtcca      180
cgtgctgtac caagtgctgg tgccagcctg ttacctgttc tcactgaaaa tctggctaat      240
gctcttgtgt atcacttctg attctgacaa tcaatcaatc aatggcctag agcactgact      300
g                                                                      301
```

        <210> 233
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 233

```
atgactgact tcccagtaag gctctctaag gggtaagtag gaggatccac aggatttgag       60
atgctaaggc cccagagatc gtttgatcca accctcttat tttcagaggg gaaaatgggg      120
cctagaagtt acagagcatc tagctggtgc gctggcaccc ctggcctcac acagactccc      180
gagtagctgg gactacaggc acacagtcac tgaagcaggc cctgttagca attctatgcg      240
tacaaattaa catgagatga gtagagactt tattgagaaa gcaagagaaa atcctatcaa      300
c                                                                      301
```

        <210> 234
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 234

```
aggtcctaca catcgagact catccatgat tgatatgaat ttaaaaatta caagcaaaga       60
catttattc atcatgatgc tttcttttgt ttcttctttt cgttttcttc ttttcttttt      120
tcaatttcag caacatactt ctcaatttct tcaggattta aaatcttgag ggattgatct      180
cgcctcatga cagcaagttc aatgttttg ccacctgact gaaccacttc caggagtgcc      240
ttgatcacca gcttaatggt cagatcatct gcttcaatgg cttcgtcagt atagttcttc      300
```

t   301

```
        <210> 235
        <211> 283
        <212> DNA
        <213> Homo sapien

        <400> 235
tggggctgtg catcaggcgg gtttgagaaa tattcaattc tcagcagaag ccagaatttg      60
aattccctca tcttttaggg aatcatttac caggtttgga gaggattcag acagctcagg     120
tgctttcact aatgtctctg aacttctgtc cctctttgtt catggatagt ccaataaata     180
atgttatctt tgaactgatg ctcataggag agaatataag aactctgagt gatatcaaca     240
ttagggattc aaagaaatat tagatttaag ctcacactgg tca                       283


        <210> 236
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 236
aggtcctcca ccaactgcct gaagcacggt taaaattggg aagaagtata gtgcagcata      60
aatactttta aatcgatcag atttccctaa cccacatgca atcttcttca ccagaagagg     120
tcggagcagc atcattaata ccaagcagaa tgcgtaatag ataaatacaa tggtatatag     180
tgggtagacg gcttcatgag tacagtgtac tgtggtatcg taatctggac ttgggttgta     240
aagcatcgtg taccagtcag aaagcatcaa tactcgacat gaacgaatat aaagaacacc     300
a                                                                      301


        <210> 237
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 237
cagtggtagt ggtggtggac gtggcgttgg tcgtggtgcc tttcttggtg cccgtcacaa      60
actcaatttt tgttcgctcc tttttggcct tttccaattt gtccatctca attttctggg     120
ccttggctaa tgcctcatag taggagtcct cagaccagcc atggggatca aacatatcct     180
ttgggtagtt ggtgccaagc tcgtcaatgg cacagaatgg atcagcttct cgtaaatcta     240
gggttccgaa attctttctt cctttggata atgtagttca tatccattcc ctcctttatc     300
t                                                                      301


        <210> 238
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 238
gggcaggttt tttctttctt ttttttgatg gtgcagaccc ttgctttatt tgtctgactt      60
gttcacagtt cagcccctg ctcagaaaac caacgggcca gctaaggaga ggaggaggca     120
ccttgagact tccggagtcg aggctctcca gggttcccca gcccatcaat cattttctgc     180
accccctgcc tgggaagcag ctccctgggg ggtgggaatg ggtgactaga agggatttca     240
gtgtgggacc cagggtctgt tcttcacagt aggaggtgga agggatgact aattctcttta     300
t                                                                      301


        <210> 239
        <211> 239
```

```
        <212> DNA
        <213> Homo sapien

        <400> 239
ataagcagct agggaattct ttatttagta atgtcctaac ataaaagttc acataactgc    60
ttctgtcaaa ccatgatact gagctttgtg acaacccaga aataactaag agaaggcaaa   120
cataatacct tagagatcaa gaaacattta cacagttcaa ctgtttaaaa atagctcaac   180
attcagccag tgagtagagt gtgaatgcca gcatacacag tatacaggtc cttcaggga    239

        <210> 240
        <211> 300
        <212> DNA
        <213> Homo sapien

        <400> 240
ggtcctaatg aagcagcagc ttccacattt taacgcaggt ttacggtgat actgtccttt    60
gggatctgcc ctccagtgga acctttaag gaagaagtgg gcccaagcta agttccacat   120
gctgggtgag ccagatgact tctgttccct ggtcactttc ttcaatgggg cgaatggggg   180
ctgccaggtt tttaaaatca tgcttcatct tgaagcacac ggtcacttca ccctcctcac   240
gctgtgggtg tactttgatg aaaataccca ctttgttggc ctttctgaag ctataatgtc   300

        <210> 241
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 241
gaggtctggt gctgaggtct ctgggctagg aagaggagtt ctgtggagct ggaagccaga    60
cctctttgga ggaaactcca gcagctatgt tggtgtctct gagggaatgc aacaaggctg   120
ctcctccatg tattggaaaa ctgcaaactg gactcaactg gaaggaagtg ctgctgccag   180
tgtgaagaac cagcctgagg tgacagaaac ggaagcaaac aggaacagcc agtcttttct   240
tcctcctcct gtcatacggt ctctctcaag catcctttgt tgtcaggggc ctaaaaggga   300
g                                                                   301

        <210> 242
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 242
ccgaggtcct gggatgcaac caatcactct gtttcacgtg acttttatca ccatacaatt    60
tgtggcattt cctcattttc tacattgtag aatcaagagt gtaaataaat gtatatcgat   120
gtcttcaaga atatatcatt ccttttcac tagaacccat tcaaaatata agtcaagaat   180
cttaatatca acaaatatat caagcaaact ggaaggcaga ataactacca taatttagta   240
taagtaccca aagtttata aatcaaaagc cctaatgata accattttta gaattcaatc   300
a                                                                   301

        <210> 243
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 243
aggtaagtcc cagtttgaag ctcaaaagat ctggtatgag cataggctca tcgacgacat    60
ggtggcccaa gctatgaaat cagagggagg cttcatctgg gcctgtaaaa actatgatgg   120
```

```
tgacgtgcag tcggactctg tggcccaagg gtatggctct ctcggcatga tgaccagcgt        180
gctggtttgt ccagatggca agacagtaga agcagaggct gcccacggga ctgtaacccg        240
tcactaccgc atgttccaga aaggacagga gacgtccacc aatcccattg cttccatttt        300
t                                                                        301
```

```
        <210> 244
        <211> 300
        <212> DNA
        <213> Homo sapien


        <400> 244
gctggtttgc aagaatgaaa tgaatgattc tacagctagg acttaacctt gaaatggaaa         60
gtcatgcaat cccatttgca ggatctgtct gtgcacatgc ctctgtagag agcagcattc        120
ccagggacct tggaaacagt tgacactgta aggtgcttgc tccccaagac acatcctaaa        180
aggtgttgta atggtgaaaa cgtcttcctt ctttattgcc ccttcttatt tatgtgaaca        240
actgtttgtc ttttgtgtat cttttttaaa ctgtaaagtt caattgtgaa aatgaatatc        300
```

```
        <210> 245
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 245
gtctgagtat ttaaaatgtt attgaaatta tccccaacca atgttagaaa agaaagaggt         60
tatatactta gataaaaaat gaggtgaatt actatccatt gaaatcatgc tcttagaatt        120
aaggccagga gatattgtca ttaatgtara cttcaggaca ctagagtata gcagccctat        180
gttttcaaag agcagagatg caattaaata ttgtttagca tcaaaaaggc cactcaatac        240
agctaataaa atgaaagacc taatttctaa agcaattctt tataattcac aaagttttaa        300
g                                                                        301
```

```
        <210> 246
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 246
ggtctgtcct acaatgcctg cttcttgaaa gaagtcggca cttttctagaa tagctaaata        60
acctgggctt attttaaaga actatttgta gctcagattg gttttcctat ggctaaaata       120
agtgcttctt gtgaaaatta aataaaacag ttaattcaaa gccttgatat atgttaccac       180
taacaatcat actaaatata ttttgaagta caaagtttga catgctctaa agtgacaacc       240
caaatgtgtc ttacaaaaca cgttcctaac aaggtatgct ttacactacc aatgcagaaa       300
c                                                                        301
```

```
        <210> 247
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 247
aggtcctttg gcagggctca tggatcagag ctcaaactgg agggaaaggc atttcgggta         60
gcctaagagg gcgactggcg gcagcacaac caaggaaggc aaggttgttt cccccacgct        120
gtgtcctgtg ttcaggtgcg acacacaatc ctcatgggaa caggatcacc catgcgctgc        180
ccttgatgat caaggttggg gcttaagtgg attaagggag gcaagttctg ggttccttgc        240
cttttcaaac catgaagtca ggtctgtat ccctcctttt cctaactgat attctaacta        300
a                                                                        301
```

```
        <210> 248
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 248
aggtccttgg agatgccatt tcagccgaag gactcttctw ttcggaagta caccctcact    60
attaggaaga ttcttagggg taatttttct gaggaaggag aactagccaa cttaagaatt   120
acaggaagaa agtggtttgg aagacagcca aagaaataaa agcagattaa attgtatcag   180
gtacattcca gcctgttggc aactccataa aaacatttca gattttaatc ccgaatttag   240
ctaatgagac tggattttttg ttttttatgt tgtgtgtcgc agagctaaaa actcagttcc   300
c                                                                   301


        <210> 249
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 249
gtccagagga agcacctggt gctgaactag gcttgccctg ctgtgaactt gcacttggag    60
ccctgacgct gctgttctcc ccgaaaaacc cgaccgacct ccgcgatctc cgtcccgccc   120
ccagggagac acagcagtga ctcagagctg gtcgcacact gtgcctccct cctcaccgcc   180
catcgtaatg aattattttg aaaattaatt ccaccatcct ttcagattct ggatggaaag   240
actgaatctt tgactcagaa ttgtttgctg aaaagaatga rgtgactttc ttagtcattt   300
a                                                                   301


        <210> 250
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 250
ggtctgtgac aaggacttgc aggctgtggg aggcaagtga cccttaacac tacacttctc    60
cttatcttta ttggcttgat aaacataatt atttctaaca ctagcttatt tccagttgcc   120
cataagcaca tcagtacttt tctctggctg gaatagtaaa ctaaagtatg gtacatctac   180
ctaaaagact actatgtgga ataatacata ctaatgaagt attacatgat ttaaagacta   240
caataaaacc aaacatgctt ataacattaa gaaaaacaat aaagatacat gattgaaacc   300
a                                                                   301


        <210> 251
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 251
gccgaggtcc tacatttggc ccagtttccc cctgcatcct ctccagggcc cctgcctcat    60
agacaacctc atagagcata ggagaactgg ttgccctggg ggcaggggga ctgtctggat   120
ggcaggggtc ctcaaaaatg ccactgtcac tgccaggaaa tgcttctgag cagtacacct   180
cattgggatc aatgaaaagc ttcaagaaat cttcaggctc actctcttga aggcccggaa   240
cctctggagg ggggcagtgg aatcccagct ccaggacgga tcctgtcgaa aagatatcct   300
c                                                                   301


        <210> 252
        <211> 301
```

```
        <212> DNA
        <213> Homo sapien

        <400> 252
gcaaccaatc actctgtttc acgtgacttt tatcaccata caatttgtgg catttcctca        60
ttttctacat tgtagaatca agagtgtaaa taaatgtata tcgatgtctt caagaatata       120
tcattccttt ttcactagga acccattcaa aatataagtc aagaatctta atatcaacaa       180
atatatcaag caaactggaa ggcagaataa ctaccataat ttagtataag tacccaaagt       240
tttataaatc aaaagcccta atgataacca tttttagaat tcaatcatca ctgtagaatc       300
a                                                                        301

        <210> 253
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 253
ttccctaaga agatgttatt ttgttgggtt ttgttccccc tccatctcga ttctcgtacc        60
caactaaaaa aaaaaaataa agaaaaaatg tgctgcgttc tgaaaaataa ctccttagct       120
tggtctgatt gttttcagac cttaaaatat aaacttgttt cacaagcttt aatccatgtg       180
gatttttttt cttagagaac cacaaaacat aaaaggagca agtcggactg aatacctgtt       240
tccatagtgc ccacagggta ttcctcacat tttctccata ggaaaatgct ttttcccaag       300
g                                                                        301

        <210> 254
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 254
cgctgcgcct ttcccttggg ggaggggcaa ggccagaggg ggtccaagtg cagcacgagg        60
aacttgacca attcccttga agcgggtggg ttaaaccctg taaatgggaa caaaatcccc       120
ccaaatctct tcatcttacc ctggtggact cctgactgta gaattttttg gttgaaacaa       180
gaaaaaaata aagctttgga cttttcaagg ttgcttaaca ggtactgaaa gactggcctc       240
acttaaactg agccaggaaa agctgcagat ttattaatgg gtgtgttagt gtgcagtgcc       300
t                                                                        301

        <210> 255
        <211> 302
        <212> DNA
        <213> Homo sapien

        <400> 255
agcttttttt tttttttttt tttttttttt ttcattaaaa aatagtgctc tttattataa        60
attactgaaa tgtttctttt ctgaatataa atataaatat gtgcaaagtt tgacttggat       120
tgggattttg ttgagttctt caagcatctc ctaatacccт caagggcctg agtagggggg       180
aggaaaaagg actggaggtg gaatctttat aaaaaacaag agtgattgag gcagattgta       240
aacattatta aaaaacaaga aacaaacaaa aaatagaga aaaaaaccac cccaacacac       300
aa                                                                       302

        <210> 256
        <211> 301
        <212> DNA
        <213> Homo sapien
```

```
<220>
<221> misc_feature
<222> (1)...(301)
<223> n = A,T,C or G

<400> 256
gttccagaaa acattgaagg tggcttccca aagtctaact agggataccc cctctagcct      60
aggaccctcc tccccacacc tcaatccacc aaaccatcca taatgcaccc agataggccc     120
accccaaaa gcctggacac cttgagcaca cagttatgac caggacagac tcatctctat      180
aggcaaatag ctgctggcaa actggcatta cctggtttgt ggggatgggg gggcaagtgt     240
gtggcctctc ggcctggtta gcaagaacat tcagggtagg cctaagttan tcgtgttagt     300
t                                                                     301


<210> 257
<211> 301
<212> DNA
<213> Homo sapien

<400> 257
gttgtggagg aactctggct tgctcattaa gtcctactga ttttcactat cccctgaatt      60
tccccactta tttttgtctt tcactatcgc aggccttaga agaggtctac ctgcctccag     120
tcttacctag tccagtctac cccctggagt tagaatggcc atcctgaagt gaaaagtaat     180
gtcacattac tcccttcagt gatttcttgt agaagtgcca atccctgaat gccaccaaga     240
tcttaatctt cacatcttta atcttatctc tttgactcct ctttacaccg gagaaggctc     300
c                                                                     301


<210> 258
<211> 301
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(301)
<223> n = A,T,C or G

<400> 258
cagcagtagt agatgccgta tgccagcacg cccagcactc ccaggatcag caccagcacc      60
aggggcccag ccaccaggcg cagaagcaag ataaacagta ggctcaagac cagagccacc     120
cccagggcaa caagaatcca ataccaggac tgggcaaaat cttcaaagat cttaacactg     180
atgtctcggg cattgaggct gtcaataana cgctgatccc ctgctgtatg gtggtgtcat     240
tggtgatccc tgggagcgcc ggtggagtaa cgttggtcca tggaaagcag cgcccacaac     300
t                                                                     301


<210> 259
<211> 301
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(301)
<223> n = A,T,C or G

<400> 259
```

```
tcatatatgc aaacaaatgc agactangcc tcaggcagag actaaaggac atctcttggg      60
gtgtcctgaa gtgatttgga cccctgaggg cagacaccta agtaggaatc ccagtgggaa     120
gcaaagccat aaggaagccc aggattcctt gtgatcagga agtgggccag gaaggtctgt     180
tccagctcac atctcatctg catgcagcac ggaccggatg cgcccactgg gtcttggctt     240
ccctcccatc ttctcaagca gtgtccttgt tgagccattt gcatccttgg ctccaggtgg     300
c                                                                      301
```

        <210> 260
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 260
```
ttttttttct ccctaaggaa aaagaaggaa caagtctcat aaaaccaaat aagcaatggt      60
aaggtgtctt aacttgaaaa agattaggag tcactggttt acaagttata attgaatgaa     120
agaactgtaa cagccacagt tggccatttc atgccaatgg cagcaaacaa caggattaac     180
tagggcaaaa taaataagtg tgtggaagcc ctgataagtg cttaataaac agactgattc     240
actgagacat cagtacctgc ccgggcggcc gctcgagccg aattctgcag atatccatca     300
c                                                                      301
```

        <210> 261
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 261
```
aaatattcga gcaaatcctg taactaatgt gtctccataa aaggctttga actcagtgaa      60
tctgcttcca tccacgattc tagcaatgac ctctcggaca tcaaagctcc tcttaaggtt     120
agcaccaact attccataca attcatcagc aggaaataaa ggctcttcag aaggttcaat     180
ggtgacatcc aatttcttct gataatttag attcctcaca accttcctag ttaagtgaag     240
ggcatgatga tcatccaaag cccagtggtc acttactcca gacttctgc aatgaagatc     300
a                                                                      301
```

        <210> 262
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 262
```
gaggagagcc tgttacagca tttgtaagca cagaatactc caggagtatt tgtaattgtc      60
tgtgagcttc ttgccgcaag tctctcagaa atttaaaaag atgcaaatcc ctgagtcacc     120
cctagacttc ctaaaccaga tcctctgggg ctggaacctg gcactctgca tttgtaatga     180
gggctttctg gtgcacacct aatttgtgc atctttgccc taaatcctgg attagtgccc     240
catcattacc cccacattat aatgggatag attcagagca gatactctcc agcaaagaat     300
c                                                                      301
```

        <210> 263
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

```
        <400> 263
tttagcttgt ggtaaatgac tcacaaaact gattttaaaa tcaagttaat gtgaattttg      60
aaaattacta cttaatccta attcacaata acaatggcat taaggtttga cttgagttgg     120
ttcttagtat tatttatggt aaataggctc ttaccacttg caaataactg gcccacatcat   180
taatgactga cttcccagta aggctctcta aggggtaagt angaggatcc acaggatttg     240
agatgctaag gccccagaga tcgtttgatc caaccctctt attttcagag gggaaaatgg     300
g                                                                     301


        <210> 264
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 264
aaagacgtta aaccactcta ctaccacttg tggaactctc aaagggtaaa tgacaaascc      60
aatgaatgac tctaaaaaca atatttacat ttaatggttt gtagacaata aaaaaacaag     120
gtggatagat ctagaattgt aacattttaa gaaaaccata scatttgaca gatgagaaag     180
ctcaattata gatgcaaagt tataactaaa ctactatagt agtaaagaaa tacatttcac     240
accccttcata taaattcact atcttggctt gaggcactcc ataaaatgta tcacgtgcat     300
a                                                                     301


        <210> 265
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 265
tgcccaagtt atgtgtaagt gtatccgcac ccagaggtaa aactacactg tcatctttgt      60
cttcttgtga cgcagtattt cttctctggg gagaagccgg gaagtcttct cctggctcta     120
catattcttg gaagtctcta atcaactttt gttccatttg tttcatttct tcaggaggga     180
ttttcagttt gtcaacatgt tctctaacaa cacttgccca tttctgtaaa gaatccaaag     240
cagtccaagg ctttgacatg tcaacaacca gcataactag agtatccttc agagatacgg     300
c                                                                     301


        <210> 266
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 266
taccgtctgc ccttcctccc atccaggcca tctgcgaatc tacatgggtc ctcctattcg      60
acaccagatc actctttcct ctacccacag gcttgctatg agcaagagac acaacctcct     120
ctcttctgtg ttccagcttc ttttcctgtt cttcccaccc cttaagttct attcctgggg     180
atagagacac caatacccat aacctctctc ctaagcctcc ttataaccca gggtgcacag     240
cacagactcc tgacaactgg taaggccaat gaactgggag ctcacagctg gctgtgcctg     300
a                                                                     301


        <210> 267
        <211> 301
        <212> DNA
        <213> Homo sapien


        <400> 267
aaagagcaca ggccagctca gcctgccctg gccatctaga ctcagcctgg ctccatgggg      60
```

```
gttctcagtg ctgagtccat ccaggaaaag ctcacctaga ccttctgagg ctgaatcttc     120
atcctcacag gcagcttctg agagcctgat attcctagcc ttgatggtct ggagtaaagc     180
ctcattctga ttcctctcct tcttttcttt caagttggct ttcctcacat ccctctgttc     240
aattcgcttc agcttgtctg ctttagccct catttccaga agcttcttct ctttggcatc     300
t                                                                      301
```

            <210> 268
            <211> 301
            <212> DNA
            <213> Homo sapien

            <400> 268

```
aatgtctcac tcaactactt cccagcctac cgtggcctaa ttctgggagt tttcttctta      60
gatcttggga gagctggttc ttctaaggag aaggaggaag gacagatgta actttggatc     120
tcgaagagga agtctaatgg aagtaattag tcaacggtcc ttgtttagac tcttggaata     180
tgctgggtgg ctcagtgagc ccttttggag aaagcaagta ttattcttaa ggagtaacca     240
cttcccattg ttctactttc taccatcatc aattgtatat tatgtattct ttggagaact     300
a                                                                      301
```

            <210> 269
            <211> 301
            <212> DNA
            <213> Homo sapien

            <400> 269

```
taacaatata cactagctat cttttaact gtccatcatt agcaccaatg aagattcaat       60
aaaattacct ttattcacac atctcaaaac aattctgcaa attcttagtg aagtttaact     120
atagtcacag accttaaata ttcacattgt tttctatgtc tactgaaaat aagttcacta     180
cttttctgga tattcttac aaaatcttat taaaattcct ggtattatca cccccaatta     240
tacagtagca caaccacctt atgtagtttt tacatgatag ctctgtagaa gtttcacatc     300
t                                                                      301
```

            <210> 270
            <211> 301
            <212> DNA
            <213> Homo sapien

            <400> 270

```
cattgaagag cttttgcgaa acatcagaac acaagtgctt ataaaattaa ttaagcctta      60
cacaagaata catattcctt ttattctaa ggagttaaac atagatgtag ctgatgtgga     120
gagcttgctg gtgcagtgca tattggataa cactattcat ggccgaattg atcaagtcaa     180
ccaactcctt gaactggatc atcagaagaa gggtggtgca cgatatactg cactagataa     240
tggaccaacc aactaaattc tctcaccagg ctgtatcagt aaactggctt aacagaaaac     300
a                                                                      301
```

            <210> 271
            <211> 301
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(301)
            <223> n = A,T,C or G

        <400> 271
aaaaggttct cataagatta acaatttaaa taaatatttg atagaacatt ctttctcatt   60
tttatagctc atctttaggg ttgatattca gttcatgctt cccttgctgt tcttgatcca   120
gaattgcaat cacttcatca gcctgtattc gctccaattc tctataaagt gggtccaagg   180
tgaaccacag agccacagca cacctctttc ccttggtgac tgccttcacc ccatganggt   240
tctctcctcc agatganaac tgatcatgcg cccacatttt gggttttata gaagcagtca   300
c   301

        <210> 272
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 272
taaattgcta agccacagat aacaccaatc aaatggaaca aatcactgtc ttcaaatgtc   60
ttatcagaaa accaaatgag cctggaatct tcataatacc taaacatgcc gtatttagga   120
tccaataatt ccctcatgat gagcaagaaa aattctttgc gcacccctcc tgcatccaca   180
gcatcttctc caacaaatat aaccttgagt ggcttcttgt aatctatgtt ctttgttttc   240
ctaaggactt ccattgcatc tcctacaata ttttctctac gcaccactag aattaagcag   300
g   301

        <210> 273
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 273
acatgtgtgt atgtgtatct ttgggaaaan aanaagacat cttgtttayt attttttggg   60
agagangctg ggacatggat aatcacwtaa tttgctayta tyactttaat ctgactygaa   120
gaaccgtcta aaaataaaat ttaccatgtc dtatattcct tatagtatgc ttatttcacc   180
ttytttctgt ccagagagag tatcagtgac ananatttma gggtgaamac atgmattggt   240
gggacttnty tttacngagm accctgcccg sgcgccctcg makcngantt ccgcsananc   300
t   301

        <210> 274
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 274
cttatatact ctttctcaga ggcaaaagag gagatgggta atgtagacaa ttctttgagg   60
aacagtaaat gattattaga gagaangaat ggaccaagga gacagaaatt aacttgtaaa   120
tgattctctt tggaatctga atgagatcaa gaggccagct ttagcttgtg gaaaagtcca   180
tctaggtatg gttgcattct cgtcttcttt tctgcagtag ataatgaggt aaccgaaggc   240
aattgtgctt cttttgataa gaagctttct tggtcatatc aggaaattcc aganaaagtc   300

c   301

```
        <210> 275
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 275
tcggtgtcag cagcacgtgg cattgaacat tgcaatgtgg agcccaaacc acagaaaatg      60
gggtgaaatt ggccaacttt ctattaactt atgttggcaa ttttgccacc aacagtaagc     120
tggcccttct aataaaagaa aattgaaagg tttctcacta aacggaatta agtagtggag     180
tcaagagact cccaggcctc agcgtacctg cccgggcggc cgctcgaagc cgaattctgc     240
agatatccat cacactggcg gncgctcgan catgcatcta gaaggnccaa ttcgccctat     300
a                                                                     301

        <210> 276
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 276
tgtacacata ctcaataaat aaatgactgc attgtggtat tattactata ctgattatat      60
ttatcatgtg acttctaatt agaaaatgta tccaaaagca aaacagcaga tatacaaaat     120
taaagagaca gaagatagac attaacagat aaggcaactt atacattgag aatccaaatc     180
caatacattt aaacatttgg gaaatgaggg ggacaaatgg aagccagatc aaattcgtgt     240
aaaactattc agtatgtttc ccttgcttca tgtctgagaa ggctctcctt caatggggat     300
g                                                                     301

        <210> 277
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 277
tttgttgatg tcagtatttt attacttgcg ttatgagtgc tcacctggga aattctaaag      60
atacagagga cttggaggaa gcagagcaac tgaatttaat ttaaaagaag gaaaacattg     120
gaatcatggc actcctgata cttttcccaaa tcaacactct caatgcccca ccctcgtcct     180
caccatagtg gggagactaa agtggccacg gatttgcctt angtgtgcag tgcgttctga     240
gttcnctgtc gattacatct gaccagtctc ctttttcga agtccntccg tccaatcttg     300
c                                                                     301

        <210> 278
        <211> 301
        <212> DNA
        <213> Homo sapien
```

```
<220>
<221> misc_feature
<222> (1)...(301)
<223> n = A,T,C or G

<400> 278
taccactaca ctccagcctg ggcaacagag caagacctgt ctcaaagcat aaaatggaat    60
aacatatcaa atgaaacagg gaaaatgaag ctgacaattt atggaagcca gggcttgtca   120
cagtctctac tgttattatg cattacctgg gaatttatat aagcccttaa taataatgcc   180
aatgaacatc tcatgtgtgc tcacaatgtt ctggcactat tataagtgct tcacaggttt   240
tatgtgttct tcgtaacttt atggantagg tactcggccg cgaacacgct aagccgaatt   300
c                                                                   301


<210> 279
<211> 301
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(301)
<223> n = A,T,C or G

<400> 279
aaagcaggaa tgacaaagct tgcttttctg gtatgttcta ggtgtattgt gacttttact    60
gttatattaa ttgccaatat aagtaaatat agattatata tgtatagtgt ttcacaaagc   120
ttagaccttt accttccagc caccccacag tgcttgatat ttcagagtca gtcattggtt   180
atacatgtgt agttccaaag cacataagct agaanaanaa atatttctag ggagcactac   240
catctgtttt cacatgaaat gccacacaca tagaactcca acatcaattt cattgcacag   300
a                                                                   301


<210> 280
<211> 301
<212> DNA
<213> Homo sapien

<400> 280
ggtactggag ttttcctccc ctgtgaaaac gtaactactg ttgggagtga attgaggatg    60
tagaaaggtg gtggaaccaa attgtggtca atggaaatag gagaatatgg ttctcactct   120
tgagaaaaaa acctaagatt agcccaggta gttgcctgta acttcagttt ttctgcctgg   180
gtttgatata gtttagggtt ggggttagat taagatctaa attacatcag gacaaagaga   240
cagactatta actccacagt taattaagga ggtatgttcc atgtttattt gttaaagcag   300
t                                                                   301


<210> 281
<211> 301
<212> DNA
<213> Homo sapien

<400> 281
aggtacaaga aggggaatgg gaaagagctg ctgctgtggc attgttcaac ttggatattc    60
gccgagcaat ccaaatcctg aatgaagggg catcttctga aaaaggagat ctgaatctca   120
atgtggtagc aatggcttta tcgggttata cggatgagaa gaactccctt tggagagaaa   180
tgtgtagcac actgcgatta cagctaaata acccgtattt gtgtgtcatg tttgcatttc   240
```

```
tgacaagtga aacaggatct tacgatggag ttttgtatga aaacaaagtt gcagtacctc     300
g                                                                      301
```

        <210> 282
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 282
```
caggtactac agaattaaaa tactgacaag caagtagttt cttggcgtgc acgaattgca     60
tccagaaccc aaaaattaag aaattcaaaa agacattttg tgggcacctg ctagcacaga    120
agcgcagaag caaagcccag gcagaaccat gctaacctta cagctcagcc tgcacagaag    180
cgcagaagca aagcccaggc agaaccatgc taaccttaca gctcagcctg cacagaagcg    240
cagaagcaaa gcccaggcag aacatgctaa ccttacagct cagcctgcac agaagcacag    300
a                                                                      301
```

        <210> 283
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 283
```
atctgtatac ggcagacaaa ctttatarag tgtagagagg tgagcgaaag gatgcaaaag     60
cactttgagg gctttataat aatatgctgc ttgaaaaaaa aaatgtgtag ttgatactca    120
gtgcatctcc agacatagta aggggttgct ctgaccaatc aggtgatcat tttttctatc    180
acttcccagg ttttatgcaa aaattttgtt aaattctata atggtgatat gcatctttta    240
ggaaacatat acatttttaa aaatctattt tatgtaagaa ctgacagacg aatttgcttt    300
g                                                                      301
```

        <210> 284
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 284
```
caggtacaaa acgctattaa gtggcttaga atttgaacat ttgtggtctt tatttacttt     60
gcttcgtgtg tgggcaaagc aacatcttcc ctaaatatat attaccaaga aaagcaagaa    120
gcagattagg tttttgacaa aacaaacagg ccaaaagggg gctgacctgg agcagagcat    180
ggtgagaggc aaggcatgag agggcaagtt tgttgtggac agatctgtgc ctactttatt    240
actggagtaa aagaaaacaa agttcattga tgtcgaagga tatatacagt gttagaaatt    300
a                                                                      301
```

        <210> 285
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 285
```
acatcaccat gatcggatcc cccacccatt atacgttgta tgtttacata aatactcttc     60
aatgatcatt agtgttttaa aaaaaatact gaaaactcct tctgcatccc aatctctaac    120
```

```
caggaaagca aatgctattt acagacctgc aagccctccc tcaaacnaaa ctatttctgg    180
attaaatatg tctgacttct tttgaggtca cacgactagg caaatgctat ttacgatctg    240
caaaagctgt ttgaagagtc aaagccccca tgtgaacacg atttctggac cctgtaacag    300
t                                                                     301
```

    <210> 286
    <211> 301
    <212> DNA
    <213> Homo sapien

    <400> 286

```
taccactgca ttccagcctg ggtgacagag tgagactccg tctccaaaaa aaactttgct    60
tgtatattat ttttgcctta cagtggatca ttctagtagg aaaggacagt aagatttttt    120
atcaaaatgt gtcatgccag taagagatgt tatattcttt tctcatttct tccccaccca    180
aaaataagct accatatagc ttataagtct caaatttttg ccttttacta aaatgtgatt    240
gtttctgttc attgtgtatg cttcatcacc tatattaggc aaattccatt ttttcccttg    300
t                                                                     301
```

    <210> 287
    <211> 301
    <212> DNA
    <213> Homo sapien

    <400> 287

```
tacagatctg ggaactaaat attaaaaatg agtgtggctg gatatatgga gaatgttggg    60
cccagaagga acgtagagat cagatattac aacagctttg ttttgagggt tagaaatatg    120
aaatgatttg gttatgaacg cacagtttag gcagcagggc cagaatcctg accctctgcc    180
ccgtggttat ctcctcccca gcttggctgc ctcatgttat cacagtattc cattttgttt    240
gttgcatgtc ttgtgaagcc atcaagattt tctcgtctgt tttcctctca ttggtaatgc    300
t                                                                     301
```

    <210> 288
    <211> 301
    <212> DNA
    <213> Homo sapien

    <400> 288

```
gtacacctaa ctgcaaggac agctgaggaa tgtaatgggc agccgctttt aaagaagtag    60
agtcaatagg aagacaaatt ccagttccag ctcagtctgg gtatctgcaa agctgcaaaa    120
gatctttaaa gacaatttca agagaatatt tccttaaagt tggcaatttg gagatcatac    180
aaaagcatct gcttttgtga tttaatttag ctcatctggc cactggaaga atccaaacag    240
tctgccttaa ttttggatga atgcatgatg gaaattcaat aatttagaaa gttaaaaaaa    300
a                                                                     301
```

    <210> 289
    <211> 301
    <212> DNA
    <213> Homo sapien

    <220>
    <221> misc_feature
    <222> (1)...(301)
    <223> n = A,T,C or G

    <400> 289

```
ggtacactgt ttccatgtta tgtttctata cattgctacc tcagtgctcc tggaaactta      60
gcttttgatg tctccaagta gtccacccttc atttaactct ttgaaactgt atcatctttg     120
ccaagtaaga gtggtggcct atttcagctg ctttgacaaa atgactggct cctgacttaa     180
cgttctataa atgaatgtgc tgaagcaaag tgcccatggt ggcggcgaan aagagaaaga     240
tgtgttttgt tttggactct ctgtggtccc ttccaatgct gtgggtttcc aaccagngga     300
a                                                                     301
```

        <210> 290
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 290

```
acactgagct cttcttgata aatatacaga atgcttggca tatacaagat tctatactac      60
tgactgatct gttcatttct ctcacagctc ttacccccaa aagcttttcc accctaagtg     120
ttctgacctc ctttttctaat cacagtaggg atagaggcag anccacctac aatgaacatg     180
gagttctatc aagaggcaga aacagcacag aatcccagtt ttaccattcg ctagcagtgc     240
tgccttgaac aaaaacattt ctccatgtct cattttcttc atgcctcaag taacagtgag     300
a                                                                     301
```

        <210> 291
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 291

```
caggtaccaa tttcttctat cctagaaaca tttcatttta tgttgttgaa acataacaac      60
tatatcagct agattttttt tctatgcttt acctgctatg gaaaatttga cacattctgc     120
tttactcttt tgtttatagg tgaatcacaa aatgtatttt tatgtattct gtagttcaat     180
agccatggct gtttacttca tttaatttat ttagcataaa gacattatga aaaggcctaa     240
acatgagctt cacttcccca ctaactaatt agcatctgtt atttcttaac cgtaatgcct     300
a                                                                     301
```

        <210> 292
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 292

```
acctttagt agtaatgtct aataataaat aagaaatcaa ttttataagg tccatatagc      60
tgtattaaat aattttcaag tctaaaagat aaaataccat cattttaaat gttggtattc     120
aaaaccaaag natataaccg aaaggaaaaa cagatgagac ataaaatgat ttgcnagatg     180
ggaaatatag tasttyatga atgttnatta aattccagtt ataatagtgg ctacacactc     240
tcactacaca cacagacccc acagtcctat atgccacaaa cacattccca taacttgaaa     300
a                                                                     301
```

```
        <210> 293
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 293
ggtaccaagt gctggtgcca gcctgttacc tgttctcact gaaaagtctg gctaatgctc      60
ttgtgtagtc acttctgatt ctgacaatca atcaatcaat ggcctagagc actgactgtt     120
aacacaaacg tcactagcaa agtagcaaca gctttaagtc taaatacaaa gctgttctgt     180
gtgagaattt tttaaaaggc tacttgtata ataacccttg tcatttttaa tgtacctcgg     240
ccgcgaccac gctaagccga attctgcaga tatccatcac actggcggcc gctcgagcat     300
g                                                                     301

        <210> 294
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 294
tgacccataa caatatacac tagctatctt tttaactgtc catcattagc accaatgaag      60
attcaataaa attaccttta ttcacacatc tcaaaacaat tctgcaaatt cttagtgaag     120
tttaactata gtcacaganc ttaaatattc acattgtttt ctatgtctac tgaaaataag     180
ttcactactt ttctgggata ttctttacaa aatcttatta aaattcctgg tattatcacc     240
cccaattata cagtagcaca accaccttat gtagttttta catgatagct ctgtagaggt     300
t                                                                     301

        <210> 295
        <211> 305
        <212> DNA
        <213> Homo sapien

        <400> 295
gtactctttc tctcccctcc tctgaattta attctttcaa cttgcaattt gcaaggatta      60
cacatttcac tgtgatgtat attgtgttgc aaaaaaaaaa gtgtcttgt ttaaaattac      120
ttggtttgtg aatccatctt gctttttccc cattggaact agtcattaac ccatctctga     180
actggtagaa aaacrtctga agagctagtc tatcagcatc tgacaggtga attggatggt     240
tctcagaacc atttcaccca gacagcctgt ttctatcctg tttaataaat tagtttgggt     300
tctct                                                                 305

        <210> 296
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 296
aggtactatg ggaagctgct aaaataatat ttgatagtaa aagtatgtaa tgtgctatct      60
cacctagtag taaactaaaa ataaactgaa acttatgga atctgaagtt attttccttg      120
attaaataga attaataaac caatatgagg aaacatgaaa ccatgcaatc tactatcaac     180
tttgaaaaag tgattgaacg aaccacttag ctttcagatg atgaacactg ataagtcatt     240
```

```
tgtcattact ataaattta aaatctgtta ataagatggc ctataggag gaaaaagggg     300
c                                                                   301
```

```
        <210> 297
        <211> 300
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(300)
        <223> n = A,T,C or G

        <400> 297
actgagtttt aactggacgc caagcaggca aggctggaag gtttgctct ctttgtgcta      60
aaggttttga aaaccttgaa ggagaatcat tttgacaaga agtacttaag agtctagaga    120
acaaagangt gaaccagctg aaagctctcg ggggaanctt acatgtgttg ttaggcctgt    180
tccatcattg ggagtgcact ggccatccct caaaattgt ctggctggc ctgagtggtc     240
accgcacctc ggccgcgacc acgctaagcc gaattctgca gatatccatc acactggcgg    300
```

```
        <210> 298
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 298
tatggggttt gtcacccaaa agctgatgct gagaaaggcc tccctggggc ccctcccgcg     60
ggcatctgag agacctggtg ttccagtgtt tctggaaatg ggtcccagtg ccgccggctg    120
tgaagctctc agatcaatca cgggaagggc ctggcggtgg tggccacctg gaaccaccct    180
gtcctgtctg tttacatttc actaycaggt tttctctggg cattacnatc tgttcccta     240
caacagtgac ctgtgcattc tgctgtggcc tgctgtgtct gcaggtggct ctcagcgagg    300
t                                                                    301
```

```
        <210> 299
        <211> 301
        <212> DNA
        <213> Homo sapien

        <400> 299
gttttgagac ggagtttcac tcttgttgcc cagactggac tgcaatggca gggtctctgc     60
tcactgcacc ctctgcctcc caggttcgag caattctcct gcctcagcct cccaggtagc    120
tgggattgca ggctcacgcc accatcccca gctaatttt ttgtattttt agtagagacg     180
gagtttcgcc atgttggcca gctggtctca aactcctgac ctcaagcgac ctgcctgcct    240
cggcctccca aagtgctgga attataggca tgagtcaaca cgcccagcct aaagatattt    300
t                                                                    301
```

```
        <210> 300
        <211> 301
        <212> DNA
        <213> Homo sapien
```

```
    <400> 300
attcagtttt atttgctgcc ccagtatctg taaccaggag tgccacaaaa tcttgccaga      60
tatgtcccac acccactggg aaaggctccc acctggctac ttcctctatc agctgggtca     120
gctgcattcc acaaggttct cagcctaatg agtttcacta cctgccagtc tcaaaactta     180
gtaaagcaag accatgacat tcccccacgg aaatcagagt ttgccccacc gtcttgttac     240
tataaagcct gcctctaaca gtccttgctt cttcacacca atcccgagcg catcccccat     300
g                                                                     301

    <210> 301
    <211> 301
    <212> DNA
    <213> Homo sapien

    <400> 301
ttaaattttt gagaggataa aaaggacaaa taatctagaa atgtgtcttc ttcagtctgc      60
agaggacccc aggtctccaa gcaaccacat ggtcaagggc atgaataatt aaaagttggt     120
gggaactcac aaagaccctc agagctgaga cacccacaac agtgggagct cacaaagacc     180
ctcagagctg agacacccac aacagtggga gctcacaaag accctcagag ctgagacacc     240
cacaacagca cctcgttcag ctgccacatg tgtgaataag gatgcaatgt ccagaagtgt     300
t                                                                     301

    <210> 302
    <211> 301
    <212> DNA
    <213> Homo sapien

    <400> 302
aggtacacat ttagcttgtg gtaaatgact cacaaaactg attttaaaat caagttaatg      60
tgaattttga aaattactac ttaatcctaa ttcacaataa caatggcatt aaggtttgac     120
ttgagttggt tcttagtatt atttatggta aataggctct taccacttgc aaataactgg     180
ccacatcatt aatgactgac ttcccagtaa ggctctctaa ggggtaagta ggaggatcca     240
caggatttga gatgctaagg ccccagagat cgtttgatcc aaccctctta ttttcagagg     300
g                                                                     301

    <210> 303
    <211> 301
    <212> DNA
    <213> Homo sapien

    <400> 303
aggtaccaac tgtggaaata ggtagaggat catttttttt ttccatatca actaagttgt      60
atattgtttt ttgacagttt aacacatctt cttctgtcag agattctttc acaatagcac     120
tggctaatgg aactaccgct tgcatgttaa aaatggtggt ttgtgaaatg atcataggcc     180
agtaacgggt atgttttttct aactgatctt ttgctcgttc caaagggacc tcaagacttc     240
catcgatttt atatctgggg tctagaaaag gagttaatct gttttccctc ataaattcac     300
c                                                                     301

    <210> 304
    <211> 301
    <212> DNA
    <213> Homo sapien

    <400> 304
acatggatgt tattttgcag actgtcaacc tgaatttgta tttgcttgac attgcctaat      60
```

```
tattagtttc agtttcagct tacccacttt ttgtctgcaa catgcaraas agacagtgcc        120
ctttttagtg tatcatatca ggaatcatct cacattggtt tgtgccatta ctggtgcagt        180
gactttcagc cacttgggta aggtggagtt ggccatatgt ctccactgca aaattactga        240
ttttcctttt gtaattaata agtgtgtgtg tgaagattct ttgagatgag gtatatatct        300
c                                                                         301
```

        <210> 305
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 305
```
gangtacagc gtggtcaagg taacaagaag aaaaaaatgt gagtggcatc ctgggatgag         60
cagggggaca gacctggaca gacacgttgt cattgctgc tgtgggtagg aaaatgggcg        120
taaaggagga gaaacagata caaaatctcc aactcagtat taaggtattc tcatgcctag        180
aatattggta gaaacaagaa tacattcata tggcaaataa ctaaccatgg tggaacaaaa        240
ttctgggatt taagttggat accaangaaa ttgtattaaa agagctgttc atggaataag        300
a                                                                         301
```

        <210> 306
        <211> 8
        <212> PRT
        <213> Homo sapien

        <400> 306
Val Leu Gly Trp Val Ala Glu Leu
 1   5

        <210> 307
        <211> 637
        <212> DNA
        <213> Homo sapien

        <400> 307
```
acagggratg aagggaaagg gagaggatga ggaagccccc ctggggattt ggtttggtcc         60
ttgtgatcag gtggtctatg gggcttatcc ctacaaagaa gaatccagaa ataggggcac        120
attgaggaat gatacttgag cccaaagagc attcaatcat tgtcttattt gccttmtttt        180
cacaccattg gtgagggagg gattaccacc ctggggttat gaagatggtt gaacacccca        240
cacatagcac cggagatatg agatcaacag tttcttagcc atagagattc acagcccaga        300
gcaggaggac gcttgcacac catgcaggat gacatggggg atgcgctcgg gattggtgtg        360
aagaagcaag gactgttaga ggcaggcttt atagtaacaa gacggtgggg caaactctga        420
tttccgtggg ggaatgtcat ggtcttgctt tactaagttt tgagactggc aggtagtgaa        480
actcattagg ctgagaacct tgtggaatgc acttgaccca sctgatagag gaagtagcca        540
ggtgggagcc ttcccagtg ggtgtgggac atatctggca agattttgtg gcactcctgg        600
ttacagatac tggggcagca aataaaactg aatcttg                                 637
```

        <210> 308
        <211> 647
        <212> DNA
        <213> Homo sapien

```
<220>
<221> misc_feature
<222> (1)...(647)
<223> n = A,T,C or G

<400> 308
acgattttca ttatcatgta aatcgggtca ctcaaggggc caaccacagc tgggagccac    60
tgctcagggg aaggttcata tgggactttc tactgcccaa ggttctatac aggatataaa   120
ggngcctcac agtatagatc tggtagcaaa gaagaagaaa caaacactga tctctttctg   180
ccacccctct gacccttgg aactcctctg acccttaga acaagcctac ctaatatctg     240
ctagagaaaa gaccaacaac ggcctcaaag gatctcttac catgaaggtc tcagctaatt   300
cttggctaag atgtgggttc cacattaggt tctgaatatg gggggaaggg tcaatttgct   360
cattttgtgt gtggataaag tcaggatgcc caggggccag agcaggggc tgcttgcttt     420
gggaacaatg gctgagcata taaccatagg ttatggggaa caaaacaaca tcaaagtcac   480
tgtatcaatt gccatgaaga cttgagggac ctgaatctac cgattcatct taaggcagca   540
ggaccagttt gagtggcaac aatgcagcag cagaatcaat ggaaacaaca gaatgattgc   600
aatgtccttt tttttctcct gcttctgact tgataaaagg ggaccgt              647

<210> 309
<211> 460
<212> DNA
<213> Homo sapien

<400> 309
actttatagt ttaggctgga cattggaaaa aaaaaaaagc cagaacaaca tgtgatagat    60
aatatgattg gctgcacact tccagactga tgaatgatga acgtgatgga ctattgtatg   120
gagcacatct tcagcaagag ggggaaatac tcatcatttt tggccagcag ttgtttgatc   180
accaaacatc atgccagaat actcagcaaa ccttcttagc tcttgagaag tcaaagtccg   240
ggggaattta ttcctggcaa ttttaattgg actccttatg tgagagcagc ggctacccag   300
ctggggtggt ggagcgaacc cgtcactagt ggacatgcag tggcagagct cctggtaacc   360
acctagagga atacacaggc acatgtgtga tgccaagcgt gacacctgta gcactcaaat   420
ttgtcttgtt tttgtctttc ggtgtgtaag attcttaagt                      460

<210> 310
<211> 539
<212> DNA
<213> Homo sapien

<400> 310
acgggactta tcaaataaag ataggaaaag aagaaaactc aaatattata ggcagaaatg    60
ctaaaggttt taaaatatgt caggattgga agaaggcatg gataaagaac aaagttcagt   120
taggaaagag aaacacagaa ggaagagaca caataaaagt cattatgtat tctgtgagaa   180
gtcagacagt aagatttgtg ggaaatgggt tggtttgttg tatggtatgt attttagcaa   240
taatctttat ggcagagaaa gctaaaatcc tttagcttgc gtgaatgatc acttgctgaa   300
ttcctcaagg taggcatgat gaaggagggt ttagaggaga cacagacaca atgaactgac   360
ctagatagaa agccttagta tactcagcta ggaatagtga ttctgagggc acactgtgac   420
atgattatgt cattacatgt atggtagtga tggggatgat aggaaggaag aacttatggc   480
atattttcac ccccacaaaa gtcagttaaa tattgggaca ctaaccatcc aggtcaaga   539

<210> 311
<211> 526
<212> DNA
<213> Homo sapien
```

```
<220>
<221> misc_feature
<222> (1)...(S26)
<223> n = A,T,C or G

<400> 311
caaatttgag ccaatgacat agaattttac aaatcaagaa gcttattctg gggccatttc        60
ttttgacgtt ttctctaaac tactaaagag gcattaatga tccataaatt atattatcta       120
catttacagc atttaaaatg tgttcagcat gaaatattag ctacagggga agctaaataa       180
attaaacatg gaataaagat ttgtccttaa atataatcta caagaagact ttgatatttg       240
tttttcacaa gtgaagcatt cttataaagt gtcataacct ttttggggaa actatgggaa       300
aaaatgggga aactctgaag ggttttaagt atcttacctg aagctacaga ctccataacc       360
tctctttaca gggagctcct gcagccccta cagaaatgag tggctgagat tcttgattgc       420
acagcaagag cttctcatct aaaccctttc cctttttagt atctgtgtat caagtataaa       480
agttctataa actgtagtnt acttatttta atccccaaag cacagt                      526

<210> 312
<211> 500
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(500)
<223> n = A,T,C or G

<400> 312
cctctctctc cccacccccт gactctagag aactgggttt tctcccagta ctccagcaat        60
tcatttctga aagcagttga gccactttat tccaaagtac actgcagatg ttcaaactct       120
ccatttctct ttcccttcca cctgccagtt ttgctgactc tcaacttgtc atgagtgtaa       180
gcattaagga cattatgctt cttcgattct gaagacaggc cctgctcatg gatgactctg       240
gcttcttagg aaaatatttt tcttccaaaa tcagtaggaa atctaaactt atcccctctt       300
tgcagatgtc tagcagcttc agacatttgg ttaagaaccc atgggaaaaa aaaaaatcct       360
tgctaatgtg gtttcctttg taaaccanga ttcttatttg nctggtatag aatatcagct       420
ctgaacgtgt ggtaaagatt tttgtgtttg aatataggag aaatcagttt gctgaaaagt       480
tagtcttaat tatctattgg                                                   500

<210> 313
<211> 718
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(718)
<223> n = A,T,C or G

<400> 313
ggagatttgt gtggtttgca gccgagggag accaggaaga tctgcatggt gggaaggacc        60
tgatgataca gaggtgagaa ataagaaagg ctgctgactt taccatctga ggccacacat       120
ctgctgaaat ggagataatt aacatcacta gaaacagcaa gatgacaata taatgtctaa       180
gtagtgacat gttttttgcac atttccagcc ctttttaaata tccacacaca caggaagcac       240
aaaaggaagc acagagatcc ctggagaaa tgccggccg ccatcttggg tcatcgatga        300
gcctcgccct gtgcctgntc ccgcttgtga gggaaggaca ttagaaaatg aattgatgtg       360
ttccttaaag gatggcagga aaacagatcc tgttgtggat atctatttga acgggattac       420
```

```
agatttgaaa tgaagtcaca aagtgagcat taccaatgag aggaaaacag acgagaaaat      480
cttgatggtt cacaagacat gcaacaaaca aaatggaata ctgtgatgac acgagcagcc      540
aactggggag gagataccac ggggcagagg tcaggattct ggccctgctg cctaactgtg      600
cgttatacca atcatttcta tttctaccct caaacaagct gtngaatatc tgacttacgg      660
ttcttntggc ccacattttc atnatccacc ccntcntttt aannttantc caaantgt       718
```

```
        <210> 314
        <211> 358
        <212> DNA
        <213> Homo sapien


        <400> 314
gtttatttac attacagaaa aaacatcaag acaatgtata ctatttcaaa tatatccata       60
cataatcaaa tatagctgta gtacatgttt tcattggtgt agattaccac aaatgcaagg      120
caacatgtgt agatctcttg tcttattctt ttgtctataa tactgtattg tgtagtccaa      180
gctctcggta gtccagccac tgtgaaacat gctcccttta gattaacctc gtggacgctc      240
ttgttgtatt gctgaactgt agtgccctgt attttgcttc tgtctgtgaa ttctgttgct      300
tctggggcat ttccttgtga tgcagaggac caccacacag atgacagcaa tctgaatt       358
```

```
        <210> 315
        <211> 341
        <212> DNA
        <213> Homo sapien


        <400> 315
taccacctcc ccgctggcac tgatgagccg catcaccatg gtcaccagca ccatgaaggc       60
ataggtgatg atgaggacat ggaatgggcc cccaaggatg gtctgtccaa agaagcgagt      120
gacccccatt ctgaagatgt ctggaacctc taccagcagg atgatgatag ccccaatgac      180
agtcaccagc tccccgacca gccggatatc gtccttaggg gtcatgtagg cttcctgaag      240
tagcttctgc tgtaagaggg tgttgtcccg ggggctcgtg cggttattgg tcctgggctt      300
gagggggcgg tagatgcagc acatggtgaa gcagatgatg t                         341
```

```
        <210> 316
        <211> 151
        <212> DNA
        <213> Homo sapien


        <400> 316
agactgggca agactcttac gccccacact gcaatttggt cttgttgccg tatccattta       60
tgtgggcctt tctcgagttt ctgattataa acaccactgg agcgatgtgt tgactggact      120
cattcaggga gctctggttg caatattagt t                                    151
```

```
        <210> 317
        <211> 151
        <212> DNA
        <213> Homo sapien


        <400> 317
agaactagtg gatcctaatg aaatacctga aacatatatt ggcatttatc aatggctcaa       60
atcttcattt atctctggcc ttaaccctgg ctcctgaggc tgcggccagc agatcccagg      120
ccagggctct gttcttgcca cacctgcttg a                                    151
```

```
        <210> 318
        <211> 151
        <212> DNA
```

<213> Homo sapien

<400> 318
actggtggga ggcgctgttt agttggctgt tttcagaggg gtctttcgga gggacctcct   60
gctgcaggct ggagtgtctt tattcctggc gggagaccgc acattccact gctgaggctg   120
tggggcggt ttatcaggca gtgataaaca t   151

<210> 319
<211> 151
<212> DNA
<213> Homo sapien

<400> 319
aactagtgga tccagagcta taggtacagt gtgatctcag ctttgcaaac acattttcta   60
catagatagt actaggtatt aatagatatg taaagaaaga aatcacacca ttaataatgg   120
taagattggg tttatgtgat tttagtgggt a   151

<210> 320
<211> 150
<212> DNA
<213> Homo sapien

<400> 320
aactagtgga tccactagtc cagtgtggtg gaattccatt gtgttggggt tctagatcgc   60
gagcggctgc cctttttttt tttttttttg ggggggaatt tttttttttt aatagttatt   120
gagtgttcta cagcttacag taaataccat   150

<210> 321
<211> 151
<212> DNA
<213> Homo sapien

<400> 321
agcaactttg tttttcatcc aggttatttt aggcttagga tttcctctca cactgcagtt   60
tagggtggca ttgtaaccag ctatggcata ggtgttaacc aaaggctgag taaacatggg   120
tgcctctgag aaatcaaagt cttcatacac t   151

<210> 322
<211> 151
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(151)
<223> n = A,T,C or G

<400> 322
atccagcatc ttctcctgtt tcttgccttc cttttttcttc ttcttasatt ctgcttgagg   60
tttgggcttg gtcagtttgc cacagggctt ggagatggtg acagtcttct ggcattcggc   120
attgtgcagg gctcgcttca nacttccagt t   151

<210> 323
<211> 151
<212> DNA

```
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(151)
        <223> n = A,T,C or G

        <400> 323
tgaggacttg tkttcttttt ctttattttt aatcctctta ckttgtaaat atattgccta      60
nagactcant tactacccag tttgtggttt twtgggagaa atgtaactgg acagttagct     120
gttcaatyaa aaagacactt ancccatgtg g                                    151

        <210> 324
        <211> 461
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(461)
        <223> n = A,T,C or G

        <400> 324
acctgtgtgg aatttcagct ttcctcatgc aaaaggattt tgtatccccg gcctacttga      60
agaagtggtc agctaaagga atccaggttg ttggttggac tgttaatacc tttgatgaaa     120
agagttacta cgaatcccat cttggttcca gctatatcac tgacagcatg gtagaagact     180
gcgaacctca cttctagact ttcacggtgg gacgaaacgg gttcagaaac tgccaggggc     240
ctcatacagg gatatcaaaa tacccttttgt gctacccagg ccctggggaa tcaggtgact     300
cacacaaatg caatagttgg tcactgcatt tttacctgaa ccaaagctaa acccggtgtt     360
gccaccatgc accatggcat gccagagttc aacactgttg ctcttgaaaa ttgggtctga     420
aaaaacgcac aagagcccct gccctgccct agctgangca c                         461

        <210> 325
        <211> 400
        <212> DNA
        <213> Homo sapien

        <400> 325
acactgtttc catgttatgt ttctacacat tgctacctca gtgctcctgg aaacttagct      60
tttgatgtct ccaagtagtc caccttcatt taactctttg aaactgtatc atctttgcca     120
agtaagagtg gtggcctatt tcagctgctt tgacaaaatg actggctcct gacttaacgt     180
tctataaatg aatgtgctga agcaaagtgc ccatggtggc ggcgaagaag agaaagatgt     240
gttttgtttt ggactctctg tggtcccttc caatgctgtg ggtttccaac caggggaagg     300
gtcccttttg cattgccaag tgccataacc atgagcacta cgctaccatg gttctgcctc     360
ctggccaagc aggctggttt gcaagaatga aatgaatgat                            400

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        <211> 1215
        <212> DNA
        <213> Homo sapien

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gaactcctac accatcgggc tgggcctgca cagtcttgag gccgaccaag agccagggag     180
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catcagcatt gcttcgcagt gccctaccgc ggggaactct tgcctcgttt ctggctgggg   360
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acagtgcccc cttgtggcac gttgacccaa ccttaccagt tggttttttca tttcttgtcc   1140
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aaaaaaaaaa aaaaa                                                   1215
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<210> 327
<211> 220
<212> PRT
<213> Homo sapien


<400> 327
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                20                  25                  30
Leu Ser Ala Ala His Cys Phe Gln Asn Ser Tyr Thr Ile Gly Leu Gly
            35                  40                  45
Leu His Ser Leu Glu Ala Asp Gln Glu Pro Gly Ser Gln Met Val Glu
        50                  55                  60
Ala Ser Leu Ser Val Arg His Pro Glu Tyr Asn Arg Pro Leu Leu Ala
65                  70                  75                  80
Asn Asp Leu Met Leu Ile Lys Leu Asp Glu Ser Val Ser Glu Ser Asp
                85                  90                  95
Thr Ile Arg Ser Ile Ser Ile Ala Ser Gln Cys Pro Thr Ala Gly Asn
                100                 105                 110
Ser Cys Leu Val Ser Gly Trp Gly Leu Leu Ala Asn Gly Arg Met Pro
            115                 120                 125
Thr Val Leu Gln Cys Val Asn Val Ser Val Val Ser Glu Glu Val Cys
        130                 135                 140
Ser Lys Leu Tyr Asp Pro Leu Tyr His Pro Ser Met Phe Cys Ala Gly
145                 150                 155                 160
Gly Gly Gln Asp Gln Lys Asp Ser Cys Asn Gly Asp Ser Gly Gly Pro
                165                 170                 175
Leu Ile Cys Asn Gly Tyr Leu Gln Gly Leu Val Ser Phe Gly Lys Ala
            180                 185                 190
Pro Cys Gly Gln Val Gly Val Pro Gly Val Tyr Thr Asn Leu Cys Lys
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Phe Thr Glu Trp Ile Glu Lys Thr Val Gln Ala Ser
210                 215                 220


<210> 328
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<211> 234
<212> DNA
<213> Homo sapien

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<210> 329
<211> 77
<212> PRT
<213> Homo sapien

<400> 329
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            20   25   30
Phe Cys Ser Gly Val Leu Val His Pro Gln Trp Val Leu Ser Ala Thr
        35   40   45
His Cys Phe Gln Asn Ser Tyr Thr Ile Gly Leu Gly Leu His Ser Leu
    50   55   60
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65   70   75

<210> 330
<211> 70
<212> DNA
<213> Homo sapien

<400> 330
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gctgcagcca   70

<210> 331
<211> 22
<212> PRT
<213> Homo sapien

<400> 331
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1   5   10   15
Val Ser Gly Ser Cys Ser
            20

<210> 332
<211> 2507
<212> DNA
<213> Homo sapien

<400> 332
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<211> 3030
<212> DNA
<213> Homo sapien


<400> 333
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    <212> DNA
    <213> Homo sapien


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<210> 335
<211> 2984
<212> DNA
<213> Homo sapien

<400> 335

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agaagggcca gcttactgtt ggtggcaaaa ttgccaacat aagttaatag aaagttggcc   2340
aatttcaccc catttttctgt ggtttgggct ccacattgca atgttcaatg ccacgtgctg   2400
ctgacaccga ccggagtact agccagcaca aaaggcaggg tagcctgaat tgctttctgc   2460
tctttacatt tcttttaaaa taagcattta gtgctcagtc cctactgagt actcttttctc   2520
tcccctcctc tgaatttaat tctttcaact tgcaatttgc aaggattaca catttcactg   2580
tgatgtatat tgtgttgcaa aaaaaaaaaa aagtgtctttt gtttaaaatt acttggtttg   2640
tgaatccatc ttgcttttttc cccattggaa ctagtcatta acccatctct gaactggtag   2700
aaaaacatct gaagagctag tctatcagca tctgacaggt gaattggatg gttctcagaa   2760
ccatttcacc cagacagcct gtttctatcc tgtttaataa attagtttgg gttctctaca   2820
tgcataacaa accctgctcc aatctgtcac ataaaagtct gtgacttgaa gtttagtcag   2880
cacccccacc aaactttatt tttctatgtg ttttttgcaa catatgagtg ttttgaaaat   2940
aaagtaccca tgtctttatt agaaaaaaaa aaaaaaaaaa aaaa                    2984
```

<210> 336
<211> 147
<212> PRT
<213> Homo sapien

<400> 336

```
Pro Ser Phe Pro Thr Leu Leu Ser Arg Arg His Leu Gly Ser Tyr Leu
1               5                   10                  15
Leu Asp Ser Glu Asn Thr Ser Gly Ala Leu Pro Arg Leu Pro Gln Thr
            20                  25                  30
Pro Lys Gln Pro Gln Lys Arg Ser Arg Ala Ala Phe Ser His Thr Gln
        35                  40                  45
Val Ile Glu Leu Glu Arg Lys Phe Ser His Gln Lys Tyr Leu Ser Ala
        50                  55                  60
Pro Glu Arg Ala His Leu Ala Lys Asn Leu Lys Leu Thr Glu Thr Gln
65                  70                  75                  80
```

Val Lys Ile Trp Phe Gln Asn Arg Arg Tyr Lys Thr Lys Arg Lys Gln
              85   90   95
Leu Ser Ser Glu Leu Gly Asp Leu Glu Lys His Ser Ser Leu Pro Ala
             100   105   110
Leu Lys Glu Glu Ala Phe Ser Arg Ala Ser Leu Val Ser Val Tyr Asn
         115   120   125
Ser Tyr Pro Tyr Tyr Pro Tyr Leu Tyr Cys Val Gly Ser Trp Ser Pro
     130   135   140
Ala Phe Trp
145

        <210> 337
        <211> 9
        <212> PRT
        <213> Homo sapien

        <400> 337
Ala Leu Thr Gly Phe Thr Phe Ser Ala
1   5

        <210> 338
        <211> 9
        <212> PRT
        <213> Homo sapien

        <400> 338
Leu Leu Ala Asn Asp Leu Met Leu Ile
1   5

        <210> 339
        <211> 318
        <212> PRT
        <213> Homo sapien

        <400> 339
Met Val Glu Leu Met Phe Pro Leu Leu Leu Leu Leu Leu Pro Phe Leu
1   5   10   15
Leu Tyr Met Ala Ala Pro Gln Ile Arg Lys Met Leu Ser Ser Gly Val
             20   25   30
Cys Thr Ser Thr Val Gln Leu Pro Gly Lys Val Val Val Val Thr Gly
         35   40   45
Ala Asn Thr Gly Ile Gly Lys Glu Thr Ala Lys Glu Leu Ala Gln Arg
     50   55   60
Gly Ala Arg Val Tyr Leu Ala Cys Arg Asp Val Glu Lys Gly Glu Leu
65   70   75   80
Val Ala Lys Glu Ile Gln Thr Thr Thr Gly Asn Gln Gln Val Leu Val
             85   90   95
Arg Lys Leu Asp Leu Ser Asp Thr Lys Ser Ile Arg Ala Phe Ala Lys
             100   105   110
Gly Phe Leu Ala Glu Glu Lys His Leu His Val Leu Ile Asn Asn Ala
         115   120   125
Gly Val Met Met Cys Pro Tyr Ser Lys Thr Ala Asp Gly Phe Glu Met
     130   135   140
His Ile Gly Val Asn His Leu Gly His Phe Leu Leu Thr His Leu Leu

```
145                      150                      155                      160
Leu Glu Lys Leu Lys Glu Ser Ala Pro Ser Arg Ile Val Asn Val Ser
            165                      170                      175
Ser Leu Ala His His Leu Gly Arg Ile His Phe His Asn Leu Gln Gly
            180                      185                      190
Glu Lys Phe Tyr Asn Ala Gly Leu Ala Tyr Cys His Ser Lys Leu Ala
            195                      200                      205
Asn Ile Leu Phe Thr Gln Glu Leu Ala Arg Arg Leu Lys Gly Ser Gly
    210                      215                      220
Val Thr Thr Tyr Ser Val His Pro Gly Thr Val Gln Ser Glu Leu Val
225                      230                      235                      240
Arg His Ser Ser Phe Met Arg Trp Met Trp Trp Leu Phe Ser Phe Phe
                245                      250                      255
Ile Lys Thr Pro Gln Gln Gly Ala Gln Thr Ser Leu His Cys Ala Leu
            260                      265                      270
Thr Glu Gly Leu Glu Ile Leu Ser Gly Asn His Phe Ser Asp Cys His
            275                      280                      285
Val Ala Trp Val Ser Ala Gln Ala Arg Asn Glu Thr Ile Ala Arg Arg
    290                      295                      300
Leu Trp Asp Val Ser Cys Asp Leu Leu Gly Leu Pro Ile Asp
305                      310                      315
```

```
<210> 340
<211> 483
<212> DNA
<213> Homo sapien


<400> 340
gccgaggtct gccttcacac ggaggacacg agactgcttc ctcaagggct cctgcctgcc      60
tggacactgg tgggaggcgc tgtttagttg gctgttttca gaggggtctt tcggagggac     120
ctcctgctgc aggctggagt gtctttattc ctggcgggag accgcacatt ccactgctga     180
ggttgtgggg gcggtttatc aggcagtgat aaacataaga tgtcatttcc ttgactccgg     240
ccttcaattt tctctttggc tgacgacgga gtccgtggtg tcccgatgta actgaccccct    300
gctccaaacg tgacatcact gatgctcttc tcgggggtgc tgatggcccg cttggtcacg     360
tgctcaatct cgccattcga ctcttgctcc aaactgtatg aagacacctg actgcacgtt     420
ttttctgggc ttccagaatt taaagtgaaa ggcagcactc ctaagctccg actccgatgc     480
ctg                                                                    483
```

```
<210> 341
<211> 344
<212> DNA
<213> Homo sapien


<400> 341
ctgctgctga gtcacagatt tcattataaa tagcctccct aaggaaaata cactgaatgc      60
tatttttact aaccattcta tttttataga aatagctgag agtttctaaa ccaactctct     120
gctgccttac aagtattaaa tattttactt ctttccataa agagtagctc aaaatatgca     180
attaatttaa taatttctga tgatggtttt atctgcagta atatgtatat catctattag     240
aatttactta atgaaaaact gaagagaaca aaatttgtaa ccactagcac ttaagtactc     300
ctgattctta acattgtctt taatgaccac aagacaacca acag                      344
```

```
<210> 342
<211> 592
<212> DNA
<213> Homo sapien
```

<400> 342

```
acagcaaaaa agaaactgag aagcccaaty tgctttcttg ttaacatoca cttatccaac    60
caatgtggaa acttcttata cttggttcca ttatgaagtt ggacaattgc tgctatcaca   120
cctggcaggt aaaccaatgc caagagagtg atggaaacca ttggcaagac tttgttgatg   180
accaggattg gaattttata aaaatattgt tgatgggaag ttgctaaagg gtgaattact   240
tccctcagaa gagtgtaaag aaaagtcaga gatgctataa tagcagctat tttaattggc   300
aagtgccact gtggaaagag ttcctgtgtg tgctgaagtt ctgaagggca gtcaaattca   360
tcagcatggg ctgtttggtg caaatgcaaa agcacaggtc tttttagcat gctggtctct   420
cccgtgtcct tatgcaaata atcgtcttct tctaaatttc tcctaggctt cattttccaa   480
agttcttctt ggtttgtgat gtctcttctg ctttccatta attctataaa atagtatggc   540
ttcagccacc cactcttcgc cttagcttga ccgtgagtct cggctgccgc tg            592
```

<210> 343
<211> 382
<212> DNA
<213> Homo sapien

<400> 343

```
ttcttgacct cctcctcctt caagctcaaa caccacctcc cttattcagg accggcactt    60
cttaatgttt gtggctttct ctccagcctc tcttaggagg ggtaatggtg gagttggcat   120
cttgtaactc tcctttctcc tttcttcccc tttctctgcc cgcctttccc atcctgctgt   180
agacttcttg attgtcagtc tgtgtcacat ccagtgattg ttttggtttc tgttcccttt   240
ctgactgccc aagggggctca gaaccccagc aatcccttcc tttcactacc ttcttttttg   300
ggggtagttg gaagggactg aaattgtggg gggaaggtag gaggcacatc aataaagagg   360
aaaccaccaa gctgaaaaaa aa                                            382
```

<210> 344
<211> 536
<212> DNA
<213> Homo sapien

<400> 344

```
ctgggcctga agctgtaggg taaatcagag gcaggcttct gagtgatgag agtcctgaga    60
caataggcca cataaacttg gctggatgga acctcacaat aaggtggtca cctcttgttt   120
gtttaggggg atgccaagga taaggccagc tcagttatat gaagagaagc agaacaaaca   180
agtctttcag agaaatggat gcaatcagag tgggatcccg gtcacatcaa ggtcacactc   240
caccttcatg tgcctgaatg gttgccaggt cagaaaaatc cacccttac gagtgcggct    300
tcgaccctat atcccccgcc cgcgtccctt tctccataaa attcttctta gtagctatta   360
ccttcttatt atttgatcta gaaattgccc tccttttacc cctaocatga gccctacaaa   420
caactaacct gccactaata gttatgtcat ccctcttatt aatcatcatc ctagccctaa   480
gtctggccta tgagtgacta caaaaaggat tagactgagc cgaataacaa aaaaaa       536
```

<210> 345
<211> 251
<212> DNA
<213> Homo sapien

<400> 345

```
acctttttgag gtctctctca ccacctccac agccaccgtc accgtgggat gtgctggatg    60
tgaatgaagc ccccatcttt gtgcctcctg aaaagagagt ggaagtgtcc gaggactttg   120
gcgtgggcca ggaaatcaca tcctacactg cccaggagcc agacacattt atggaacaga   180
aaataacata tcggatttgg agagacactg ccaactggct ggagattaat ccggacactg   240
gtgccatttc c                                                       251
```

```
            <210> 346
            <211> 282
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(282)
            <223> n = A,T,C or G

<400> 346
cgcgtctctg acactgtgat catgacaggg gttcaaacag aaagtgcctg ggccctcctt        60
ctaagtcttg ttaccaaaaa aaggaaaaag aaaagatctt ctcagttaca aattctggga       120
agggagacta tacctggctc ttgccctaag tgagaggtct tccctcccgc accaaaaaat       180
agaaaggctt tctatttcac tggcccaggt aggggggaagg agagtaactt tgagtctgtg      240
ggtctcattt cccaaggtgc cttcaatgct catnaaaacc aa                          282

            <210> 347
            <211> 201
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(201)
            <223> n = A,T,C or G

<400> 347
acacacataa tattataaaa tgccatctaa ttggaaggag ctttctatca ttgcaagtca        60
taaatataac ttttaaaana ntactancag cttttaccta ngctcctaaa tgcttgtaaa       120
tctgagactg actggaccca cccagaccca gggcaaagat acatgttacc atatcatctt       180
tataaagaat tttttttttgt c                                                 201

            <210> 348
            <211> 251
            <212> DNA
            <213> Homo sapien

<400> 348
ctgttaatca caacatttgt gcatcacttg tgccaagtga gaaaatgttc taaaatcaca        60
agagagaaca gtgccagaat gaaactgacc ctaagtccca ggtgcccctg ggcaggcaga       120
aggagacact cccagcatgg aggagggtt atcttttcat cctaggtcag gtctacaatg        180
ggggaaggtt ttattataga actcccaaca gcccacctca ctcctgccac ccacccgatg       240
gccctgcctc c                                                            251

            <210> 349
            <211> 251
            <212> DNA
            <213> Homo sapien

<400> 349
taaaaatcaa gccatttaat tgtatctttg aaggtaaaca atatatggga gctggatcac        60
aaccctgag gatgccagag ctatgggtcc agaacatggt gtggtattat caacagagtt        120
cagaagggtc tgaactctac gtgttaccag agaacataat gcaattcatg cattccactt       180
agcaattttg taaaatacca gaaacagacc ccaagagtct ttcaagatga ggaaaattca       240
```

```
actcctggtt t                                                      251

       <210> 350
       <211> 908
       <212> DNA
       <213> Homo sapien

       <400> 350
ctggacactt tgcgagggct tttgctggct gctgctgctg cccgtcatgc tactcatcgt       60
agcccgcccg gtgaagctcg ctgctttccc tacctcctta agtgactgcc aaacgcccac      120
cggctggaat tgctctggtt atgatgacag agaaaatgat ctcttcctct gtgacaccaa      180
cacctgtaaa tttgatgggg aatgtttaag aattggagac actgtgactt gcgtctgtca      240
gttcaagtgc aacaatgact atgtgcctgt gtgtggctcc aatggggaga gctaccagaa      300
tgagtgttac ctgcgacagg ctgcatgcaa acagcagagt gagatacttg tggtgtcaga      360
aggatcatgt gccacagtcc atgaaggctc tggagaaact agtcaaaagg agacatccac      420
ctgtgatatt tgccagtttg gtgcagaatg tgacgaagat gccgaggatg tctggtgtgt      480
gtgtaatatt gactgttctc aaaccaactt caatcccctc tgcgcttctg atgggaaatc      540
catgtctttg ggtcgatgtc aagataacac aactacaact actaagtctg aagatgggca      600
ttatgcaaga acagattatg cagagaatgc taacaaatta gaagaaagtg ccagagaaca      660
ccacatacct tgtccggaac attacaatgg cttctgcatg catggaagt gtgagcattc       720
tatcaatatg caggagccat cttgcaggtg tgatgctggt tatactggac aacactgtga      780
aaaaaaggac tacagtgttc tatacgttgt tcccggtcct gtacgatttc agtatgtctt      840
aatcgcag                                                              900
                                                                       908

       <210> 351
       <211> 472
       <212> DNA
       <213> Homo sapien

       <400> 351
ccagttattt gcaagtggta agagcctatt taccataaat aatactaaga accaactcaa       60
gtcaaacctt aatgccattg ttattgtgaa ttaggattaa gtagtaattt tcaaaattca      120
cattaacttg attttaaaat cagwtttgyg agtcatttac cacaagctaa atgtgtacac      180
tatgataaaa acaaccattg tattcctgtt tttctaaaca gtcctaattt ctaacactgt      240
atatatcctt cgacatcaat gaactttgtt ttcttttact ccagtaataa agtaggcaca      300
gatctgtcca caacaaactt gccctctcat gccttgcctc tcaccatgct ctgctccagg      360
tcagcccct tttggcctgt ttgtttttgtc aaaaacctaa tctgcttctt gctttttcttg      420
gtaatatata tttagggaag atgttgcttt gcccacacac gaagcaaagt aa_           472

       <210> 352
       <211> 251
       <212> DNA
       <213> Homo sapien

       <400> 352
ctcaaagcta atctctcggg aatcaaacca gaaaagggca aggatcttag gcatggtgga       60
tgtggataag gccaggtcaa tggctgcaag catgcagaga aagaggtaca tcggagcgtg      120
caggctgcgt tccgtcctta cgatgaagac cacgatgcag tttccaaaca ctgccactac      180
atacatggaa aggagggggga agccaaccca gaaatgggct ttctctaatc ctgggatacc      240
aataagcaca a                                                          251

       <210> 353
       <211> 436
       <212> DNA
```

<213> Homo sapien

<400> 353

```
tttttttttt  tttttttttt  tttttacaa  caatgcagtc  atttatttat  tgagtatgtg     60
cacattatgg  tattattact  atactgatta  tatttatcat  gtgacttcta  attaraaaat    120
gtatccaaaa  gcaaaacagc  agatatacaa  aattaaagag  acagaagata  gacattaaca    180
gataaggcaa  cttatacatt  gacaatccaa  atccaataca  tttaaacatt  tgggaaatga    240
ggggacaaa   tggaagccar  atcaaatttg  tgtaaaacta  ttcagtatgt  ttcccttgct    300
tcatgtctga  raaggctctc  ccttcaatgg  ggatgacaaa  ctccaaatgc  cacacaaatg    360
ttaacagaat  actagattca  cactggaacg  ggggtaaaga  agaaattatt  ttctataaaa    420
gggctcctaa  tgtagt                                                        436
```

<210> 354
<211> 854
<212> DNA
<213> Homo sapien

<400> 354

```
ccttttctag  ttcaccagtt  ttctgcaagg  atgctggtta  gggagtgtct  gcaggaggag     60
caagtctgaa  accaaatcta  ggaaacatag  gaaacgagcc  aggcacaggg  ctggtgggcc    120
atcagggacc  acccttgggg  ttgatatttt  gcttaatctg  catcttttga  gtaagatcat    180
ctggcagtag  aagctgttct  ccaggtacat  ttctctagct  catgtacaaa  aacatcctga    240
aggactttgt  caggtgcctt  gctaaaagcc  agatgcgttc  ggcacttcct  tggtctgagg    300
ttaattgcac  acctacaggc  actgggctca  tgctttcaag  tattttgtcc  tcactttagg    360
gtgagtgaaa  gatccccatt  ataggagcac  ttcggagaga  tcatataaaa  gctgactctt    420
gagtacatgc  agtaatgggg  tagatgtgtg  tggtgtgtct  tcattcctgc  aagggtgctt    480
gttagggagt  gtttccagga  ggaacaagtc  tgaaaccaat  catgaaataa  atggtaggtg    540
tgaactggaa  aactaattca  aaagagagat  cgtgatatca  gtgtggttga  tacaccttgg    600
caatatggaa  ggctctaatt  tgcccatatt  tgaaataata  attcagcttt  ttgtaataca    660
aaataacaaa  ggattgagaa  tcatggtgtc  taatgtataa  aagacccagg  aaacataaat    720
cattgtaccc  attttccctt  ccaaaatgtg  agcggcgggc  ctgctgcttt  caaggctgtc    780
acacgggatg  tcag                                                          840
                                                                          854
```

<210> 355
<211> 676
<212> DNA
<213> Homo sapien

<400> 355

```
gaaattaagt  atgagctaaa  ttccctgtta  aaacctctag  gggtgacaga  tctcttcaac     60
caggtcaaag  ctgatctttc  tggaatgtca  ccaaccaagg  gcctatattt  atcaaaagcc    120
atccacaagt  catacctgga  tgtcagcgaa  gagggcacgg  aggcagcagc  agccactggg    180
gacagcatcg  ctgtaaaaag  cctaccaatg  agagctcagt  tcaaggcgaa  ccacccttc     240
ctgttcttta  taaggcacac  tcataccaac  acgatcctat  tctgtggcaa  gcttgcctct    300
ccctaatcag  atggggttga  gtaaggctca  gagttgcaga  tgaggtgcag  agacaatcct    360
gtgactttcc  cacggccaaa  aagctgttca  cacctcacgc  acctctgtgc  ctcagtttgc    420
tcatctgcaa  aataggtcta  ggatttcttc  caaccatttc  atgagttgtg  aagctaaggc    480
tttgttaatc  atggaaaaag  gtagacttat  gcagaaagcc  tttctggctt  tcttatctgt    540
ggtgtctcat  ttgagtgctg  tccagtgaca  tgatcaagtc  aatgagtaaa  attttaaggg    600
attagatttt  cttgacttgt  atgtatctgt  gagatcttga  ataagtgacc  tgacatctct    660
gcttaaagaa  aaccag                                                        676
```

<210> 356
<211> 574

<212> DNA
<213> Homo sapien

<400> 356

```
tttttttttt tttttcagga aaacattctc ttactttatt tgcatctcag caaaggttct      60
catgtggcac ctgactggca tcaaaccaaa gttcgtaggc caacaaagat gggccactca     120
caagcttccc atttgtagat ctcagtgcct atgagtatct gacacctgtt cctctcttca     180
gtctcttagg gaggcttaaa tctgtctcag gtgtgctaag agtgccagcc caaggkggtc     240
aaaagtccac aaaactgcag tctttgctgg gatagtaagc caagcagtgc ctggacagca     300
gagttctttt cttgggcaac agataaccag acaggactct aatcgtgctc ttattcaaca     360
ttcttctgtc tctgcctaga ctggaataaa aagccaatct ctctcgtggc acagggaagg     420
agatacaagc tcgtttacat gtgatagatc taacaaaggc atctaccgaa gtctggtctg     480
gatagacggc acagggagct cttaggtcag cgctgctggt tggaggacat tcctgagtcc     540
agctttgcag cctttgtgca acagtacttt ccca                                 574
```

<210> 357
<211> 393
<212> DNA
<213> Homo sapien

<400> 357

```
tttttttttt tttttttttt tttttttttt tacagaatat aratgcttta tcactgkact      60
taatatggkg kcttgttcac tatacttaaa aatgcaccac tcataaatat ttaattcagc     120
aagccacaac caaracttga ttttatcaac aaaaacccct aaatataaac ggsaaaaaag     180
atagatataa ttattccagt ttttttaaaa cttaaaarat attccattgc cgaattaara     240
araarataag tgttatatgg aaagaagggc attcaagcac actaaaraaa cctgaggkaa     300
gcataatctg tacaaaatta aactgtcctt tttggcattt taacaaattt gcaacgktct     360
tttttttctt tttctgtttt tttttttttt tac                                  393
```

<210> 358
<211> 630
<212> DNA
<213> Homo sapien

<400> 358

```
acagggtaaa caggaggatc cttgctctca cggagcttac attctagcag gaggacaata      60
ttaatgttta taggaaaatg atgagtttat gacaaaggaa gtagatagtg ttttacaaga     120
gcatagagta gggaagctaa tccagcacag ggaggtcaca gagacatccc taaggaagtg     180
gagtttaaac tgagagaagc aagtgcttaa actgaaggat gtgttgaaga agaagggaga     240
gtagaacaat ttgggcagag ggaaccttat agaccctaag gtgggaaggt tcaaagaact     300
gaaagagagc tagaacagct ggagccgttc tccggtgtaa agaggagtca aagagataag     360
attaaagatg tgaagattaa gatcttggtg gcattcaggg attggcactt ctacaagaaa     420
tcactgaagg gagtaatgtg acattacttt tcacttcagg atggccattc taactccagg     480
gggtagactg gactaggtaa gactggaggc aggtagacct cttctaaggc ctgcgatagt     540
gaaagacaaa aataagtggg gaaattcagg ggatagtgaa aatcagtagg acttaatgag     600
caagccagag gttcctccac aacaaccagt                                      630
```

<210> 359
<211> 620
<212> DNA
<213> Homo sapien

<400> 359

```
acagcattcc aaaatataca tctagagact aarrgtaaat gctctatagt gaagaagtaa      60
taattaaaaa atgctactaa tatagaaaat ttataatcag aaaaataaat attcagggag     120
```

```
ctcaccagaa gaataaagtg ctctgccagt tattaaagga ttactgctgg tgaattaaat     180
atggcattcc ccaagggaaa tagagagatt cttctggatt atgttcaata tttatttcac     240
aggattaact gttttaggaa cagatataaa gcttcgccac ggaagagatg gacaaagcac     300
aaagacaaca tgatacctta ggaagcaaca ctaccctttc aggcataaaa tttggagaaa     360
tgcaacatta tgcttcatga ataatatgta gaaagaaggt ctgatgaaaa tgacatcctt     420
aatgtaagat aactttataa gaattctggg tcaaataaaa ttctttgaag aaaacatcca     480
aatgtcattg acttatcaaa tactatcttg gcatataacc tatgaaggca aaactaaaca     540
aacaaaaagc tcacaccaaa caaaaccatc aacttatttt gtattctata acatacgaga     600
ctgtaaagat gtgacagtgt                                                  620
```

        <210> 360
        <211> 431
        <212> DNA
        <213> Homo sapien

        <400> 360
```
aaaaaaaaaa agccagaaca acatgtgata gataatatga ttggctgcac acttccagac      60
tgatgaatga tgaacgtgat ggactattgt atggagcaca tcttcagcaa gagggggaaa     120
tactcatcat ttttggccag cagttgtttg atcaccaaac atcatgccag aatactcagc     180
aaaccttctt agctcttgag aagtcaaagt ccggggggaat ttattcctgg caattttaat     240
tggactcctt atgtgagagc agcggctacc cagctggggt ggtggagcga acccgtcact     300
agtggacatg cagtggcaga gctcctggta accacctaga ggaatacaca ggcacatgtg     360
tgatgccaag cgtgacacct gtagcactca aatttgtctt gttttttgtct ttcggtgtgt     420
agattcttag t                                                           431
```

        <210> 361
        <211> 351
        <212> DNA
        <213> Homo sapien

        <400> 361
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acactgattt ccgatcaaaa gaatcatcat ctttaccttg actttttcagg gaattactga      60
actttcttct cagaagatag ggcacagcca ttgccttggc ctcacttgaa gggtctgcat     120
ttgggtcctc tggtctcttg ccaagtttcc cagccactcg agggagaaat atcgggaggt     180
ttgacttcct ccggggcttt cccgagggct tcaccgtgag ccctgcggcc ctcagggctg     240
caatcctgga ttcaatgtct gaaacctcgc tctctgcctg ctggacttct gaggccgtca     300
ctgccactct gtcctccagc tctgacagct cctcatctgt ggtcctgttg t              351
```

        <210> 362
        <211> 463
        <212> DNA
        <213> Homo sapien

        <400> 362
```
acttcatcag gccataatgg gtgcctcccg tgagaatcca agcacctttg gactgcgcga      60
tgtagatgag ccggctgaag atcttgcgca tgcgcggctt cagggcgaag ttcttggcgc     120
ccccggtcac agaaatgacc aggttgggtg ttttcaggtg ccagtgctgg gtcagcagct     180
cgtaaaggat ttccgcgtcc gtgtcgcagg acagacgtat atacttccct ttcttcccca     240
gtgtctcaaa ctgaatatcc ccaaaggcgt cggtaggaaa ttccttggtg tgtttcttgt     300
agttccattt ctcactttgg ttgatctggg tgccttccat gtgctggctc tgggcatagc     360
cacacttgca cacattctcc ctgataagca cgatggtgtg gacaggaagg aaggatttca     420
ttgagcctgc ttatggaaac tggtattgtt agcttaaata gac                       463
```

        <210> 363
        <211> 653
```

```
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(653)
<223> n = A,T,C or G

<400> 363
acccccgagt ncctgnctgg catactgnga acgaccaacg acacacccaa gctcggcctc    60
ctcttggnga ttctgggtga catcttcatg aatggcaacc gtgccagwga ggctgtcctc   120
tgggaggcac tacgcaagat gggactgcgt cctggggtga gacatcctct ccttggagat   180
ctaacgaaac ttctcaccta tgagttgtaa agcagaaata cctgnactac agacgagtgc   240
ccaacagcaa ccccccggaa gtatgagttc ctctrgggcc tccgttccta ccatgagasc   300
tagcaagatg naagtgttga gantcattgc agaggttcag aaaagagacc cntcgtgact   360
ggtctgcaca gttcatggag gctgcagatg aggccttgga tgctctggat gctgctgcag   420
ctgaggccga agcccgggct gaagcaagaa cccgcatggg aattggagat gaggctgtgt   480
ntgggccctg gagctgggat gacattgagt ttgagctgct gacctgggat gaggaaggag   540
attttggaga tccntggtcc agaattccat ttaccttctg ggccagatac caccagaatg   600
cccgctccag attccctcag acctttgccg gtcccattat tggtcstggt ggt           653

<210> 364
<211> 401
<212> DNA
<213> Homo sapien

<400> 364
actagaggaa agacgttaaa ccactctact accacttgtg gaactctcaa agggtaaatg    60
acaaagccaa tgaatgactc taaaaacaat atttacattt aatggtttgt agacaataaa   120
aaaacaaggt ggatagatct agaattgtaa cattttaaga aaaccatagc atttgacaga   180
tgagaaagct caattataga tgcaaagtta taactaaact actatagtag caaagaaata   240
catttcacac ccttcatata aattcactat cttggcttga ggcactccat aaaatgtatc   300
acgtgcatag taaatcttta tatttgctat ggcgttgcac tagaggactt ggactgcaac   360
aagtggatgc gcggaaaatg aaatcttctt caatagccca g                       401

<210> 365
<211> 356
<212> DNA
<213> Homo sapien

<400> 365
ccagtgtcat atttgggctt aaaattccaa gaagggcact tcaaatggct ttgcatttgc    60
atgtttcagt gctagagcgt aggaatagac cctggcgtcc actgtgagat gttcttcagc   120
taccagagca tcaagtctct gcagcaggtc attcttgggt aaagaaatga cttccacaaa   180
ctctccatcc cctggctttg gcttcggcct tgcgttttcg gcatcatctc cgttaatggt   240
gactgtcacg atgtgtatag tacagtttga caagcctggg tccatacaga ccgctggaga   300
acattcggca atgtcccctt tgtagccagt ttcttcttcg agctcccgga gagcag         356

<210> 366
<211> 1851
<212> DNA
<213> Homo sapien

<400> 366
tcatcaccat tgccagcagc ggcaccgtta gtcaggtttt ctgggaatcc cacatgagta    60
```

```
cttccgtgtt cttcattctt cttcaatagc cataaatctt ctagctctgg ctggctgttt        120
tcacttcctt taagcctttg tgactcttcc tctgatgtca gctttaagtc ttgttctgga        180
ttgctgtttt cagaagagat ttttaacatc tgttttttctt tgtagtcaga aagtaactgg       240
caaattacat gatgatgact agaaacagca tactctctgg ccgtctttcc agatcttgag        300
aagatacatc aacattttgc tcaagtagag ggctgactat acttgctgat ccacaacata        360
tgattaaaaa tttcaccact tgctgttttt gctcatgtat accaagtagc agtggtgtga        420
ggccatgctt gttttttgat tcgatatcag caccgtataa gagcagtgct ttggccatta        480
atttatcttc attgtagaca gcatagtgta gagtggtatt tccatactca tctggaatat        540
ttggatcagt gccatgttcc agcaacatta acgcacattc atcttcctgg cattgtacgg        600
cctttgtcag agctgtcctc tttttgttgt caaggacatt aagttgacat cgtctgtcca        660
gcacgagttt tactacttct gaattcccat tggcagaggc cagatgtaga gcagtcctct        720
tttgcttgtc cctcttgttc acatccgtgt ccctgagcat gacgatgaga tcctttctgg        780
ggactttacc ccaccaggca gctctgtgga gcttgtccag atcttctcca tggacgtggt        840
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cgctcccctg cagcaggggga agcagtggca gcaccacttg cacctcttgc tcccaagcgt        960
cttcacagag gagtcgttgt ggtctccaga agtgcccacg ttgctcttgc cgctccccct       1020
gtccatccag ggaggaagaa atgcaggaaa tgaaagatgc atgcacgatg gtatactcct       1080
cagccatcaa acttctggac agcaggtcac ttccagcaag gtggagaaag ctgtccaccc       1140
acagaggatg agatccagaa accacaatat ccattcacaa acaaacactt ttcagccaga       1200
cacaggtact gaaatcatgt catctgcggc aacatggtgg aacctaccca atcacacatc       1260
aagagatgaa gacactgcag tatatctgca caacgtaata ctcttcatcc ataacaaaat       1320
aatataattt tcctctggag ccatatggat gaactatgaa ggaagaactc cccgaagaag       1380
ccagtcgcag agaagccaca ctgaagctct gtcctcagcc atcagcgcca cggacaggar       1440
tgtgtttctt ccccagtgat gcagcctcaa gttatcccga agctgccgca gcacacggtg       1500
gctcctgaga aacaccccag ctcttccggt ctaacacagg caagtcaata aatgtgataa       1560
tcacataaac agaattaaaa gcaaagtcac ataagcatct caacagacac agaaaaggca       1620
tttgacaaaa tccagcatcc ttgtatttat tgttgcagtt ctcagaggaa atgcttctaa       1680
cttttcccca tttagtatta tgttggctgt gggcttgtca taggtggttt ttattacttt       1740
aaggtatgtc ccttctatgc ctgttttgct gagggttta attctcgtgc c                 1800
                                                                        1851
```

        <210> 367
        <211> 668
        <212> DNA
        <213> Homo sapien

        <400> 367
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cttgagcttc caaataygga agactggccc ttacacasgt caatgttaaa atgaatgcat          60
ttcagtattt tgaagataaa attrgtagat ctataccttg ttttttgatt cgatatcagc        120
accrtataag agcagtgctt tggccattaa tttatctttc attrtagaca gcrtagtgya        180
gagtggtatt tccatactca tctggaatat ttggatcagt gccatgttcc agcaacatta        240
acgcacattc atcttcctgg cattgtacgg cctgtcagta ttagacccaa aaacaaatta        300
catatcttag gaattcaaaa taacattcca cagctttcac caactagtta tatttaaagg        360
agaaaactca tttttatgcc atgtattgaa atcaaaccca cctcatgctg atatagttgg        420
ctactgcata ccttttatcag agctgtcctc tttttgttgt caaggacatt aagttgacat        480
cgtctgtcca gcaggagttt tactacttct gaattcccat tggcagaggc cagatgtaga        540
gcagtcctat gagagtgaga agactttta ggaaattgta gtgcactagc tacagccata        600
gcaatgattc atgtaactgc aaacactgaa tagcctgcta ttactctgcc ttcaaaaaaa        660
aaaaaaaa                                                                 668
```

        <210> 368
        <211> 1512
        <212> DNA
        <213> Homo sapien

<400> 368

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tgggctgggc trgaatcccc tgctgggggtt ggcaggtttt ggctgggatt gacttttytc   120
ttcaaacaga ttggaaaccc ggagttacct gctagttggt gaaactggtt ggtagacgcg   180
atctgttggc tactactggc ttctcctggc tgttaaaagc agatggtggt tgaggttgat   240
tccatgccgg ctgcttcttc tgtgaagaag ccatttggtc tcaggagcaa gatgggcaag   300
tggtgctgcc gttgcttccc ctgctgcagg gagagcggca agagcaacgt gggcacttct   360
ggagaccacg acgactctgc tatgaagaca ctcaggagca agatgggcaa gtggtgccgc   420
cactgcttcc cctgctgcag ggggagtggc aagagcaacg tgggcgcttc tggagaccac   480
gacgaytctg ctatgaagac actcaggaac aagatgggca agtggtgctg ccactgcttc   540
ccctgctgca gggggagcrg caagagcaag gtgggcgctt ggggagacta cgatgacagt   600
gccttcatgg agcccaggta ccacgtccgt ggagaagatc tggacaagct ccacagagct   660
gcctggtggg gtaaagtccc cagaaaggat ctcatcgtca tgctcaggga cactgacgtg   720
aacaagaagg acaagcaaaa gaggactgct ctacatctgg cctctgccaa tgggaattca   780
gaagtagtaa aactcstgct ggacagacga tgtcaactta atgtccttga caacaaaaag   840
aggacagctc tgayaaaggc cgtacaatgc caggaagatg aatgtgcgtt aatgttgctg   900
gaacatggca ctgatccaaa tattccagat gagtatggaa ataccactct rcactaygct   960
rtctayaatg aagataaatt aatggccaaa gcactgctct tatayggtgc tgatatcgaa  1020
tcaaaaaaca aggtatagat ctactaattt tatcttcaaa atactgaaat gcattcattt  1080
taacattgac gtgtgtaagg gccagtcttc cgtattggga agctcaagca taacttgaat  1140
gaaaatattt tgaaatgacc taattatctm agactttatt ttaaatattg ttattttcaa  1200
agaagcatta gagggtacag tttttttttt ttaaatgcac ttctggtaaa tactttgtt   1260
gaaaacactg aatttgtaaa aggtaatact tactattttt caattttttcc ctcctaggat  1320
ttttttcccc taatgaatgt aagatggcaa aatttgccct gaaataggtt ttacatgaaa  1380
actccaagaa aagttaaaca tgtttcagtg aatagagatc ctgctccttt ggcaagttcc  1440
taaaaaacag taatagatac gaggtgatgc gcctgtcagt ggcaaggttt aagatatttc  1500
tgatctcgtg cc                                                      1512
```

<210> 369
<211> 1853
<212> DNA
<213> Homo sapien

<400> 369

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gggtcgccca gggggsgcgt gggctttcct cgggtgggtg tgggttttcc ctgggtgggg    60
tgggctgggc trgaatcccc tgctgggggtt ggcaggtttt ggctgggatt gactttty tc  120
ttcaaacaga ttggaaaccc ggagttacct gctagttggt gaaactggtt ggtagacgcg   180
atctgttggc tactactggc ttctcctggc tgttaaaagc agatggtggt tgaggttgat   240
tccatgccgg ctgcttcttc tgtgaagaag ccatttggtc tcaggagcaa gatgggcaag   300
tggtgctgcc gttgcttccc ctgctgcagg gagagcggca agagcaacgt gggcacttct   360
ggagaccacg acgactctgc tatgaagaca ctcaggagca agatgggcaa gtggtgccgc   420
cactgcttcc cctgctgcag ggggagtggc aagagcaacg tgggcgcttc tggagaccac   480
gacgaytctg ctatgaagac actcaggaac aagatgggca agtggtgctg ccactgcttc   540
ccctgctgca gggggagcrg caagagcaag gtgggcgctt ggggagacta cgatgacagy   600
gccttcatgg akcccaggta ccacgtccrt ggagaagatc tggacaagct ccacagagct   660
gcctggtggg gtaaagtccc cagaaaggat ctcatcgtca tgctcaggga cackgaygtg   720
aacaagargg acaagcaaaa gaggactgct ctacatctgg cctctgccaa tgggaattca   780
gaagtagtaa aactcstgct ggacagacga tgtcaactta atgtccttga caacaaaaag   840
aggacagctc tgayaaaggc cgtacaatgc caggaagatg aatgtgcgtt aatgttgctg   900
gaacatggca ctgatccaaa tattccagat gagtatggaa ataccactct rcactaygct   960
rtctayaatg aagataaatt aatggccaaa gcactgctct tatayggtgc tgatatcgaa  1020
tcaaaaaaca agcatggcct cacaccactg ytacttggtr tacatgagca aaaacagcaa  1080
gtsgtgaaat ttttaatyaa gaaaaaagcg aattaaaat gcrctggata gatatggaag  1140
ractgctctc atacttgctg tatgttgtgg atcagcaagt atagtcagcc ytctacttga  1200
gcaaaatrtt gatgtatctt ctcaagatct ggaaagacgg ccagagagta tgctgtttct  1260
```

```
agtcatcatc atgtaatttg ccagttactt tctgactaca aagaaaaaca gatgttaaaa    1320
atctcttctg aaaacagcaa tccagaacaa gacttaaagc tgacatcaga ggaagagtca    1380
caaaggctta aaggaagtga aaacagccag ccagaggcat ggaaactttt aaatttaaac    1440
ttttggttta atgttttttt tttttgcctt aataatatta gatagtccca aatgaaatwa    1500
cctatgagac taggctttga gaatcaatag attctttttt taagaatctt ttggctagga    1560
gcggtgtctc acgcctgtaa ttccagcacc ttgagaggct gaggtgggca gatcacgaga    1620
tcaggagatc gagaccatcc tggctaacac ggtgaaaccc catctctact aaaaatacaa    1680
aaacttagct gggtgtggtg gcgggtgcct gtagtcccag ctactcagga rgctgaggca    1740
ggagaatggc atgaacccgg gaggtggagg ttgcagtgag ccgagatccg ccactacact    1800
ccagcctggg tgacagagca agactctgtc tcaaaaaaaa aaaaaaaaaa aaa           1853
```

<210> 370
<211> 2184
<212> DNA
<213> Homo sapien

<400> 370

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ggcacgagaa ttaaaaccct cagcaaaaca ggcatagaag ggacatacct taaagtaata     60
aaaaccacct atgacaagcc cacagccaac ataatactaa atggggaaaa gttagaagca    120
tttcctctga gaactgcaac aataaataca aggatgctgg attttgtcaa atgccttttc    180
tgtgtctgtt gagatgctta tgtgactttg cttttaattc tgtttatgtg attatcacat    240
ttattgactt gcctgtgtta gaccggaaga gctggggtgt ttctcaggag ccaccgtgtg    300
ctgcggcagc ttcgggataa cttgaggctg catcactggg gaagaaacac aytcctgtcc    360
gtggcgctga tggctgagga cagagcttca gtgtggcttc tctgcgactg gcttcttcgg    420
ggagttcttc cttcatagtt catccatatg gctccagagg aaaattatat tattttgtta    480
tggatgaaga gtattacgtt gtgcagatat actgcagtgt cttcatctct tgatgtgtga    540
ttgggtaggt tccaccatgt tgccgcagat gacatgattt cagtacctgt gtctggctga    600
aaagtgtttg tttgtgaatg gatattgtgg tttctggatc tcatcctctg tgggtggaca    660
gctttctcca ccttgctgga agtgacctgc tgtccagaag tttgatggct gaggagtata    720
ccatcgtgca tgcatctttc atttcctgca tttcttcctc cctggatgga cagggggagc    780
ggcaagagca acgtgggcac ttctggagac cacaacgact cctctgtgaa gacgcttggg    840
agcaagaggt gcaagtggtg ctgccactgc ttcccctgct gcagggggagc ggcaagagca    900
acgtggtcgc ttggggagac tacgatgaca gcgccttcat ggatcccagg taccacgtcc    960
atggagaaga tctggacaag ctccacagag ctgcctggtg gggtaaagtc cccagaaagg   1020
atctcatcgt catgctcagg gacacggatg tgaacaagag ggacaagcaa aagaggactg   1080
ctctacatct ggcctctgcc aatgggaatt cagaagtagt aaaactcgtg ctggacagac   1140
gatgtcaact taatgtcctt gacaacaaaa agaggacagc tctgacaaag gccgtacaat   1200
gccaggaaga tgaatgtgcg ttaatgttgc tggaacatgg cactgatcca aatattccag   1260
atgagtatgg aaataccact ctacactatg ctgtctacaa tgaagataaa ttaatggcca   1320
aagcactgct cttatacggt gctgatatcg aatcaaaaaa caagcatggc ctcacaccac   1380
tgctacttgg tatacatgag caaaaacagc aagtggtgaa atttttaatc aagaaaaaag   1440
cgaatttaaa tgcgctggat agatatggaa gaactgctct catacttgct gtatgttgtg   1500
gatcagcaag tatagtcagc cctctacttg agcaaaatgt tgatgtatct tctcaagatc   1560
tggaaagacg gccagagagt atgctgtttc tagtcatcat catgtaattt gccagttact   1620
ttctgactac aaagaaaaac agatgttaaa aatctcttct gaaaacagca atccagaaca   1680
agacttaaag ctgacatcag aggaagagtc acaaaggctt aaaggaagtg aaaacagcca   1740
gccagaggca tggaaacttt taaatttaaa cttttggttt aatgtttttt ttttttgcct   1800
taataatatt agatagtccc aaatgaaatw acctatgaga ctaggctttg agaatcaata   1860
gattcttttt ttaagaatct tttggctagg agcggtgtct cacgcctgta attccagcac   1920
cttgagaggc tgaggtgggc agatcacgag atcaggagat cgagaccatc ctggctaaca   1980
cggtgaaacc ccatctctac taaaaataca aaaacttagc tgggtgtggt ggcgggtgcc   2040
tgtagtccca gctactcagg argctgaggc aggagaatgg catgaacccg ggaggtggag   2100
gttgcagtga gccgagatcc gccactacac tccagcctgg gtgacagagc aagactctgt   2160
ctcaaaaaaa aaaaaaaaaa aaaa                                          2184
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<210> 371
<211> 1855
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(1855)
<223> n = A,T,C or G

<400> 371

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gccgccccg cataaccgtc agactggcct gtaacggctt gcaggcgcac gccgcacgcg      180
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ttggctggca tgtagccgct tggcttggct ttgcattytt tgctkggctk ggcgttgkty     300
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tcgcgttcct ttgctggact tgaccttty tctgctgggt ttggcattcc tttggggtgg     420
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gggcgtgggc tttccccggg tgggtgtggg ttttcctggg gtggggtggg ctgtgctggg     540
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gtaacntgct agttggtgaa actggttggt agacgcgatc tgctggtact actgtttctc     660
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gacgcttggg agcaagaggt gcaagtggtg ctgcccactg cttcccctgc tgcaggggag     900
cggcaagagc aacgtggkcg cttggggaga ctacgatgac agcgccttca tggakcccag     960
gtaccacgtc crtggagaag atctggacaa gctccacaga gctgcctggt ggggtaaagt    1020
ccccagaaag gatctcatcg tcatgctcag ggacactgay gtgaacaaga rggacaagca   1080
aaagaggact gctctacatc tggcctctgc caatgggaat tcagaagtag taaaactcgt    1140
gctggacaga cgatgtcaac ttaatgtcct tgacaacaaa aagaggacag ctctgacaaa    1200
ggccgtacaa tgccaggaag atgaatgtgc gttaatgttg ctggaacatg gcactgatcc    1260
aaatattcca gatgagtatg gaaataccac tctacactat gctgtctaca atgaagataa    1320
attaatggcc aaagcactgc tcttatacgg tgctgatatc gaatcaaaaa acaaggtata    1380
gatctactaa ttttatcttc aaaatactga aatgcattca ttttaacatt gacgtgtgta    1440
agggccagtc ttccgtattt ggaagctcaa gcataacttg aatgaaaata ttttgaaatg    1500
acctaattat ctaagacttt attttaaata ttgttatttt caaagaagca ttagagggta    1560
cagttttttt tttttaaatg cacttctggt aaatacttt gttgaaaaca ctgaattgt      1620
aaaaggtaat acttactatt tttcaatttt tccctcctag gatttttttc ccctaatgaa    1680
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acatgtttca gtgaatagag atcctgctcc tttggcaagt tcctaaaaaa cagtaataga    1800
tacgaggtga tgcgcctgtc agtggcaagg tttaagatat ttctgatctc gtgcc         1855
```

<210> 372
<211> 1059
<212> DNA
<213> Homo sapien

<400> 372

```
gcaacgtggg cacttctgga gaccacaacg actcctctgt gaagacgctt gggagcaaga      60
ggtgcaagtg gtgctgccca ctgcttcccc tgctgcaggg gagcggcaag agcaacgtgg     120
gcgcttgrgg agactmcgat gacagygcct tcatggagcc caggtaccac gtccgtggag     180
aagatctgga caagctccac agagctgccc tggtggggta aagtccccag aaaggatctc     240
atcgtcatgc tcagggacac tgaygtgaac aagarggaca agcaaaagag gactgctcta     300
catctggcct ctgccaatgg gaattcagaa gtagtaaaac tcstgctgga cagacgatgt     360
```

```
caacttaatg tccttgacaa caaaaagagg acagctctga yaaaggccgt acaatgccag        420
gaagatgaat gtgcgttaat gttgctggaa catggcactg atccaaatat tccagatgag        480
tatggaaata ccactctrca ctaygctrtc tayaatgaag ataaattaat ggccaaagca        540
ctgctcttat ayggtgctga tatcgaatca aaaaacaagg tatagatcta ctaattttat        600
cttcaaaata ctgaaatgca ttcattttaa cattgacgtg tgtaagggcc agtcttccgt        660
atttggaagc tcaagcataa cttgaatgaa aatattttga aatgacctaa ttatctaaga        720
ctttatttta aatattgtta ttttcaaaga agcattagag ggtacagttt tttttttta         780
aatgcacttc tggtaaatac ttttgttgaa aacactgaat ttgtaaaagg taatacttac        840
tattttttcaa ttttttccctc ctaggatttt tttcccctaa tgaatgtaag atggcaaaat       900
ttgccctgaa ataggtttta catgaaaact ccaagaaaag ttaaacatgt ttcagtgaat        960
agagatcctg ctcctttggc aagttcctaa aaaacagtaa tagatacgag gtgatgcgcc       1020
tgtcagtggc aaggtttaag atatttctga tctcgtgcc                              1059
```

<210> 373
<211> 1155
<212> DNA
<213> Homo sapien

<400> 373

```
atggtggttg aggttgattc catgccggct gcctcttctg tgaagaagcc atttggtctc         60
aggagcaaga tgggcaagtg gtgctgccgt tgcttcccct gctgcaggga gagcggcaag        120
agcaacgtgg gcacttctgg agaccacgac gactctgcta tgaagacact caggagcaag        180
atgggcaagt ggtgccgcca ctgcttcccc tgctgcaggg ggagtggcaa gagcaacgtg        240
ggcgcttctg agaccacga cgactctgct atgaagacac tcaggaacaa gatgggcaag        300
tggtgctgcc actgcttccc ctgctgcagg gggagcggca agagcaaggt gggcgcttgg        360
ggagactacg atgacagtgc cttcatggag cccaggtacc acgtccgtgg agaagatctg        420
gacaagctcc acagagctgc ctggtggggt aaagtcccca gaaaggatct catcgtcatg        480
ctcagggaca ctgacgtgaa caagaaggac aagcaaaaga ggactgctct acatctggcc        540
tctgccaatg gaattcaga agtagtaaaa ctcctgctgg acagacgatg tcaacttaat        600
gtccttgaca acaaaaagag gacagctctg ataaaggccg tacaatgcca ggaagatgaa        660
tgtgcgttaa tgttgctgga acatggcact gatccaaata ttccagatga gtatggaaat        720
accactctgc actacgctat ctataatgaa gataaattaa tggccaaagc actgctctta        780
tatggtgctg atatcgaatc aaaaaacaag catggcctca caccactgtt acttggtgta        840
catgagcaaa aacagcaagt cgtgaaattt ttaatcaaga aaaaagcgaa tttaaatgca        900
ctggatagat atggaaggac tgctctcata cttgctgtat gttgtggatc agcaagtata        960
gtcagccttc tacttgagca aaatattgat gtatcttctc aagatctatc tggacagacg       1020
gccagagagt atgctgtttc tagtcatcat catgtaattt gccagttact ttctgactac       1080
aaagaaaaac agatgctaaa aatctcttct gaaaacagca atccagaaaa tgtctcaaga       1140
accagaaata aataa                                                        1155
```

<210> 374
<211> 2000
<212> DNA
<213> Homo sapien

<400> 374

```
atggtggttg aggttgattc catgccggct gcctcttctg tgaagaagcc atttggtctc         60
aggagcaaga tgggcaagtg gtgctgccgt tgcttcccct gctgcaggga gagcggcaag        120
agcaacgtgg gcacttctgg agaccacgac gactctgcta tgaagacact caggagcaag        180
atgggcaagt ggtgccgcca ctgcttcccc tgctgcaggg ggagtggcaa gagcaacgtg        240
ggcgcttctg agaccacga cgactctgct atgaagacac tcaggaacaa gatgggcaag        300
tggtgctgcc actgcttccc ctgctgcagg gggagcggca agagcaaggt gggcgcttgg        360
ggagactacg atgacagtgc cttcatggag cccaggtacc acgtccgtgg agaagatctg        420
gacaagctcc acagagctgc ctggtggggt aaagtcccca gaaaggatct catcgtcatg        480
ctcagggaca ctgacgtgaa caagaaggac aagcaaaaga ggactgctct acatctggcc        540
```

```
tctgccaatg ggaattcaga agtagtaaaa ctcctgctgg acagacgatg tcaacttaat        600
gtccttgaca acaaaaagag gacagctctg ataaaggccg tacaatgcca ggaagatgaa        660
tgtgcgttaa tgttgctgga acatggcact gatccaaata ttccagatga gtatggaaat        720
accactctgc actacgctat ctataatgaa gataaattaa tggccaaagc actgctctta        780
tatggtgctg atatcgaatc aaaaaacaag catggcctca caccactgtt acttggtgta        840
catgagcaaa aacagcaagt cgtgaaattt ttaatcaaga aaaagcgaa tttaaatgca        900
ctggatagat atggaaggac tgctctcata cttgctgtat gttgtggatc agcaagtata        960
gtcagccttc tacttgagca aaatattgat gtatcttctc aagatctatc tggacagacg       1020
gccagagagt atgctgtttc tagtcatcat catgtaattt gccagttact ttctgactac       1080
aaagaaaaac agatgctaaa aatctcttct gaaaacagca atccagaaca agacttaaag       1140
ctgacatcag aggaagagtc acaaaggttc aaaggcagtg aaaatagcca gccagagaaa       1200
atgtctcaag aaccagaaat aaataaggat ggtgatagag aggttgaaga agaaatgaag       1260
aagcatgaaa gtaataatgt gggattacta gaaaacctga ctaatggtgt cactgctggc       1320
aatggtgata atggattaat tcctcaaagg aagagcagaa cacctgaaaa tcagcaattt       1380
cctgacaacg aaagtgaaga gtatcacaga atttgcgaat tagtttctga ctacaaagaa       1440
aaacagatgc caaaatactc ttctgaaaac agcaacccag aacaagactt aaagctgaca       1500
tcagaggaag agtcacaaag gcttgagggc agtgaaaatg gccagccaga gctagaaaat       1560
tttatggcta tcgaagaaat gaagaagcac ggaagtactc atgtcggatt cccagaaaac       1620
ctgactaatg gtgccactgc tggcaatggt gatgatggat taattcctcc aaggaagagc       1680
agaacacctg aaagccagca atttcctgac actgagaatg aagagtatca cagtgacgaa       1740
caaaatgata ctcagaagca attttgtgaa gaacagaaca ctggaatatt acacgatgag       1800
attctgattc atgaagaaaa gcagatagaa gtggttgaaa aaatgaattc tgagctttct       1860
cttagttgta agaaagaaaa agacatcttg catgaaaata gtacgttgcg ggaagaaatt       1920
gccatgctaa gactggagct agacacaatg aaacatcaga gccagctaaa aaaaaaaaaa       1980
aaaaaaaaaa aaaaaaaaaa                                                    2000
```

```
        <210> 375
        <211> 2040
        <212> DNA
        <213> Homo sapien


        <400> 375
atggtggttg aggttgattc catgccggct gcctcttctg tgaagaagcc atttggtctc         60
aggagcaaga tgggcaagtg gtgctgccgt tgcttccct gctgcaggga gagcggcaag        120
agcaacgtgg gcacttctgg agaccacgac gactctgcta tgaagacact caggagcaag        180
atgggcaagt ggtgccgcca ctgcttcccc tgctgcaggg ggagtggcaa gagcaacgtg        240
ggcgcttctg agaccacga cgactctgct atgaagacac tcaggaacaa gatgggcaag        300
tggtgctgcc actgcttccc ctgctgcagg gggagcggca agagcaaggt gggcgcttgg        360
ggagactacg atgacagtgc cttcatggag cccaggtacc acgtccgtgg agaagatctg        420
gacaagctcc acagagctgc ctggtggggt aaagtcccca gaaaggatct catcgtcatg        480
ctcagggaca ctgacgtgaa caagaaggac aagcaaaaga ggactgctct acatctggcc        540
tctgccaatg ggaattcaga agtagtaaaa ctcctgctgg acagacgatg tcaacttaat        600
gtccttgaca acaaaaagag gacagctctg ataaaggccg tacaatgcca ggaagatgaa        660
tgtgcgttaa tgttgctgga acatggcact gatccaaata ttccagatga gtatggaaat        720
accactctgc actacgctat ctataatgaa gataaattaa tggccaaagc actgctctta        780
tatggtgctg atatcgaatc aaaaaacaag catggcctca caccactgtt acttggtgta        840
catgagcaaa aacagcaagt cgtgaaattt ttaatcaaga aaaagcgaa tttaaatgca        900
ctggatagat atggaaggac tgctctcata cttgctgtat gttgtggatc agcaagtata        960
gtcagccttc tacttgagca aaatattgat gtatcttctc aagatctatc tggacagacg       1020
gccagagagt atgctgtttc tagtcatcat catgtaattt gccagttact ttctgactac       1080
aaagaaaaac agatgctaaa aatctcttct gaaaacagca atccagaaca agacttaaag       1140
ctgacatcag aggaagagtc acaaaggttc aaaggcagtg aaaatagcca gccagagaaa       1200
atgtctcaag aaccagaaat aaataaggat ggtgatagag aggttgaaga agaaatgaag       1260
aagcatgaaa gtaataatgt gggattacta gaaaacctga ctaatggtgt cactgctggc       1320
aatggtgata atggattaat tcctcaaagg aagagcagaa cacctgaaaa tcagcaattt       1380
```

```
cctgacaacg aaagtgaaga gtatcacaga atttgcgaat tagtttctga ctacaaagaa   1440
aaacagatgc caaaatactc ttctgaaaac agcaacccag aacaagactt aaagctgaca   1500
tcagaggaag agtcacaaag gcttgagggc agtgaaaatg gccagccaga gaaaagatct   1560
caagaaccag aaataaataa ggatggtgat agagagctag aaaattttat ggctatcgaa   1620
gaaatgaaga agcacggaag tactccatgtc ggattcccag aaaacctgac taatggtgcc   1680
actgctggca atggtgatga tggattaatt cctccaagga agagcagaac acctgaaagc   1740
cagcaatttc ctgacactga gaatgaagag tatcacagtg acgaacaaaa tgatactcag   1800
aagcaatttt gtgaagaaca gaacactgga atattacacg atgagattct gattcatgaa   1860
gaaaagcaga tagaagtggt tgaaaaaatg aattctgagc tttctcttag ttgtaagaaa   1920
gaaaaagaca tcttgcatga aaatagtacg ttgcgggaag aaattgccat gctaagactg   1980
gagctagaca caatgaaaca tcagagccag ctaaaaaaaa aaaaaaaaaa aaaaaaaaa    2040
```

<210> 376
<211> 329
<212> PRT
<213> Homo sapien

<400> 376

```
Met Asp Ile Val Val Ser Gly Ser His Pro Leu Trp Val Asp Ser Phe
1               5                   10                  15
Leu His Leu Ala Gly Ser Asp Leu Leu Ser Arg Ser Leu Met Ala Glu
            20                  25                  30
Glu Tyr Thr Ile Val His Ala Ser Phe Ile Ser Cys Ile Ser Ser Ser
        35                  40                  45
Leu Asp Gly Gln Gly Glu Arg Gln Glu Gln Arg Gly His Phe Trp Arg
    50                  55                  60
Pro Gln Arg Leu Leu Cys Glu Asp Ala Trp Glu Gln Glu Val Gln Val
65                  70                  75                  80
Val Leu Pro Leu Leu Pro Leu Leu Gln Gly Ser Gly Lys Ser Asn Val
                85                  90                  95
Val Ala Trp Gly Asp Tyr Asp Asp Ser Ala Phe Met Asp Pro Arg Tyr
            100                 105                 110
His Val His Gly Glu Asp Leu Asp Lys Leu His Arg Ala Ala Trp Trp
        115                 120                 125
Gly Lys Val Pro Arg Lys Asp Leu Ile Val Met Leu Arg Asp Thr Asp
        130                 135                 140
Val Asn Lys Arg Asp Lys Gln Lys Arg Thr Ala Leu His Leu Ala Ser
145                 150                 155                 160
Ala Asn Gly Asn Ser Glu Val Val Lys Leu Val Leu Asp Arg Arg Cys
                165                 170                 175
Gln Leu Asn Val Leu Asp Asn Lys Lys Arg Thr Ala Leu Thr Lys Ala
            180                 185                 190
Val Gln Cys Gln Glu Asp Glu Cys Ala Leu Met Leu Leu Glu His Gly
        195                 200                 205
Thr Asp Pro Asn Ile Pro Asp Glu Tyr Gly Asn Thr Thr Leu His Tyr
    210                 215                 220
Ala Val Tyr Asn Glu Asp Lys Leu Met Ala Lys Ala Leu Leu Leu Tyr
225                 230                 235                 240
Gly Ala Asp Ile Glu Ser Lys Asn Lys His Gly Leu Thr Pro Leu Leu
            245                 250                 255
Leu Gly Ile His Glu Gln Lys Gln Gln Val Val Lys Phe Leu Ile Lys
            260                 265                 270
Lys Lys Ala Asn Leu Asn Ala Leu Asp Arg Tyr Gly Arg Thr Ala Leu
        275                 280                 285
Ile Leu Ala Val Cys Cys Gly Ser Ala Ser Ile Val Ser Pro Leu Leu
```

```
            290                    295                    300
Glu Gln Asn Val Asp Val Ser Ser Gln Asp Leu Glu Arg Arg Pro Glu
305                    310                    315                    320
Ser Met Leu Phe Leu Val Ile Ile Met
                    325


        <210> 377
        <211> 148
        <212> PRT
        <213> Homo sapien


        <220>
        <221> VARIANT
        <222> (1)...(148)
        <223> Xaa = Any Amino Acid


        <400> 377
Met Thr Xaa Pro Ser Trp Ser Pro Gly Thr Thr Ser Val Glu Lys Ile
 1                   5                    10                   15
Trp Thr Ser Ser Thr Glu Leu Pro Trp Trp Gly Lys Val Pro Arg Lys
                20                    25                    30
Asp Leu Ile Val Met Leu Arg Asp Thr Asp Val Asn Lys Xaa Asp Lys
          35                    40                    45
Gln Lys Arg Thr Ala Leu His Leu Ala Ser Ala Asn Gly Asn Ser Glu
    50                    55                    60
Val Val Lys Leu Xaa Leu Asp Arg Arg Cys Gln Leu Asn Val Leu Asp
65                    70                    75                    80
Asn Lys Lys Arg Thr Ala Leu Xaa Lys Ala Val Gln Cys Gln Glu Asp
                85                    90                    95
Glu Cys Ala Leu Met Leu Leu Glu His Gly Thr Asp Pro Asn Ile Pro
                100                   105                   110
Asp Glu Tyr Gly Asn Thr Thr Leu His Tyr Ala Xaa Tyr Asn Glu Asp
          115                   120                   125
Lys Leu Met Ala Lys Ala Leu Leu Leu Tyr Gly Ala Asp Ile Glu Ser
          130                   135                   140
Lys Asn Lys Val
145


        <210> 378
        <211> 1719
        <212> PRT
        <213> Homo sapien


        <400> 378
Met Val Val Glu Val Asp Ser Met Pro Ala Ala Ser Ser Val Lys Lys
 1                   5                    10                   15
Pro Phe Gly Leu Arg Ser Lys Met Gly Lys Trp Cys Cys Arg Cys Phe
                20                    25                    30
Pro Cys Cys Arg Glu Ser Gly Lys Ser Asn Val Gly Thr Ser Gly Asp
          35                    40                    45
His Asp Asp Ser Ala Met Lys Thr Leu Arg Ser Lys Met Gly Lys Trp
    50                    55                    60
Cys Arg His Cys Phe Pro Cys Cys Arg Gly Ser Gly Lys Ser Asn Val
65                    70                    75                    80
Gly Ala Ser Gly Asp His Asp Asp Ser Ala Met Lys Thr Leu Arg Asn
```

```
                    85                      90                      95
Lys Met Gly Lys Trp Cys Cys His Cys Phe Pro Cys Cys Arg Gly Ser
            100                     105                     110
Gly Lys Ser Lys Val Gly Ala Trp Gly Asp Tyr Asp Asp Ser Ala Phe
            115                     120                     125
Met Glu Pro Arg Tyr His Val Arg Gly Glu Asp Leu Asp Lys Leu His
        130                     135                     140
Arg Ala Ala Trp Trp Gly Lys Val Pro Arg Lys Asp Leu Ile Val Met
145                     150                     155                     160
Leu Arg Asp Thr Asp Val Asn Lys Lys Asp Lys Gln Lys Arg Thr Ala
                165                     170                     175
Leu His Leu Ala Ser Ala Asn Gly Asn Ser Glu Val Val Lys Leu Leu
            180                     185                     190
Leu Asp Arg Arg Cys Gln Leu Asn Val Leu Asp Asn Lys Lys Arg Thr
        195                     200                     205
Ala Leu Ile Lys Ala Val Gln Cys Gln Glu Asp Glu Cys Ala Leu Met
    210                     215                     220
Leu Leu Glu His Gly Thr Asp Pro Asn Ile Pro Asp Glu Tyr Gly Asn
225                     230                     235                     240
Thr Thr Leu His Tyr Ala Ile Tyr Asn Glu Asp Lys Leu Met Ala Lys
                245                     250                     255
Ala Leu Leu Leu Tyr Gly Ala Asp Ile Glu Ser Lys Asn Lys His Gly
                260                     265                     270
Leu Thr Pro Leu Leu Leu Gly Val His Glu Gln Lys Gln Gln Val Val
            275                     280                     285
Lys Phe Leu Ile Lys Lys Lys Ala Asn Leu Asn Ala Leu Asp Arg Tyr
    290                     295                     300
Gly Arg Thr Ala Leu Ile Leu Ala Val Cys Cys Gly Ser Ala Ser Ile
305                     310                     315                     320
Val Ser Leu Leu Leu Glu Gln Asn Ile Asp Val Ser Ser Gln Asp Leu
                325                     330                     335
Ser Gly Gln Thr Ala Arg Glu Tyr Ala Val Ser Ser His His His Val
            340                     345                     350
Ile Cys Gln Leu Leu Ser Asp Tyr Lys Glu Lys Gln Met Leu Lys Ile
    355                     360                     365
Ser Ser Glu Asn Ser Asn Pro Glu Asn Val Ser Arg Thr Arg Asn Lys
    370                     375                     380
Pro Arg Thr His Met Val Val Glu Val Asp Ser Met Pro Ala Ala Ser
385                     390                     395                     400
Ser Val Lys Lys Pro Phe Gly Leu Arg Ser Lys Met Gly Lys Trp Cys
            405                     410                     415
Cys Arg Cys Phe Pro Cys Cys Arg Glu Ser Gly Lys Ser Asn Val Gly
            420                     425                     430
Thr Ser Gly Asp His Asp Asp Ser Ala Met Lys Thr Leu Arg Ser Lys
            435                     440                     445
Met Gly Lys Trp Cys Arg His Cys Phe Pro Cys Cys Arg Gly Ser Gly
            450                     455                     460
Lys Ser Asn Val Gly Ala Ser Gly Asp His Asp Asp Ser Ala Met Lys
465                     470                     475                     480
Thr Leu Arg Asn Lys Met Gly Lys Trp Cys Cys His Cys Phe Pro Cys
                485                     490                     495
Cys Arg Gly Ser Gly Lys Ser Lys Val Gly Ala Trp Gly Asp Tyr Asp
            500                     505                     510
Asp Ser Ala Phe Met Glu Pro Arg Tyr His Val Arg Gly Glu Asp Leu
            515                     520                     525
```

```
Asp Lys Leu His Arg Ala Ala Trp Trp Gly Lys Val Pro Arg Lys Asp
    530                 535                 540
Leu Ile Val Met Leu Arg Asp Thr Asp Val Asn Lys Lys Asp Lys Gln
545                 550                 555                 560
Lys Arg Thr Ala Leu His Leu Ala Ser Ala Asn Gly Asn Ser Glu Val
            565                 570                 575
Val Lys Leu Leu Leu Asp Arg Arg Cys Gln Leu Asn Val Leu Asp Asn
            580                 585                 590
Lys Lys Arg Thr Ala Leu Ile Lys Ala Val Gln Cys Gln Glu Asp Glu
        595                 600                 605
Cys Ala Leu Met Leu Leu Glu His Gly Thr Asp Pro Asn Ile Pro Asp
    610                 615                 620
Glu Tyr Gly Asn Thr Thr Leu His Tyr Ala Ile Tyr Asn Glu Asp Lys
625                 630                 635                 640
Leu Met Ala Lys Ala Leu Leu Leu Tyr Gly Ala Asp Ile Glu Ser Lys
            645                 650                 655
Asn Lys His Gly Leu Thr Pro Leu Leu Leu Gly Val His Glu Gln Lys
            660                 665                 670
Gln Gln Val Val Lys Phe Leu Ile Lys Lys Lys Ala Asn Leu Asn Ala
        675                 680                 685
Leu Asp Arg Tyr Gly Arg Thr Ala Leu Ile Leu Ala Val Cys Cys Gly
    690                 695                 700
Ser Ala Ser Ile Val Ser Leu Leu Leu Glu Gln Asn Ile Asp Val Ser
705                 710                 715                 720
Ser Gln Asp Leu Ser Gly Gln Thr Ala Arg Glu Tyr Ala Val Ser Ser
            725                 730                 735
His His His Val Ile Cys Gln Leu Leu Ser Asp Tyr Lys Glu Lys Gln
        740                 745                 750
Met Leu Lys Ile Ser Ser Glu Asn Ser Asn Pro Glu Gln Asp Leu Lys
        755                 760                 765
Leu Thr Ser Glu Glu Glu Ser Gln Arg Phe Lys Gly Ser Glu Asn Ser
    770                 775                 780
Gln Pro Glu Lys Met Ser Gln Glu Pro Glu Ile Asn Lys Asp Gly Asp
785                 790                 795                 800
Arg Glu Val Glu Glu Glu Met Lys Lys His Glu Ser Asn Asn Val Gly
            805                 810                 815
Leu Leu Glu Asn Leu Thr Asn Gly Val Thr Ala Gly Asn Gly Asp Asn
            820                 825                 830
Gly Leu Ile Pro Gln Arg Lys Ser Arg Thr Pro Glu Asn Gln Gln Phe
        835                 840                 845
Pro Asp Asn Glu Ser Glu Glu Tyr His Arg Ile Cys Glu Leu Val Ser
    850                 855                 860
Asp Tyr Lys Glu Lys Gln Met Pro Lys Tyr Ser Ser Glu Asn Ser Asn
865                 870                 875                 880
Pro Glu Gln Asp Leu Lys Leu Thr Ser Glu Glu Glu Ser Gln Arg Leu
            885                 890                 895
Glu Gly Ser Glu Asn Gly Gln Pro Glu Leu Glu Asn Phe Met Ala Ile
            900                 905                 910
Glu Glu Met Lys Lys His Gly Ser Thr His Val Gly Phe Pro Glu Asn
        915                 920                 925
Leu Thr Asn Gly Ala Thr Ala Gly Asn Gly Asp Asp Gly Leu Ile Pro
    930                 935                 940
Pro Arg Lys Ser Arg Thr Pro Glu Ser Gln Gln Phe Pro Asp Thr Glu
945                 950                 955                 960
Asn Glu Glu Tyr His Ser Asp Glu Gln Asn Asp Thr Gln Lys Gln Phe
```

```
                    965                   970                   975
    Cys Glu Glu Gln Asn Thr Gly Ile Leu His Asp Glu Ile Leu Ile His
                980                   985                   990
    Glu Glu Lys Gln Ile Glu Val Val Glu Lys Met Asn Ser Glu Leu Ser
                995                  1000                  1005
    Leu Ser Cys Lys Lys Glu Lys Asp Ile Leu His Glu Asn Ser Thr Leu
               1010                  1015                  1020
    Arg Glu Glu Ile Ala Met Leu Arg Leu Glu Leu Asp Thr Met Lys His
    1025                  1030                  1035                  104
    Gln Ser Gln Leu Pro Arg Thr His Met Val Val Glu Val Asp Ser Met
                         1045                  1050                  1055
    Pro Ala Ala Ser Ser Val Lys Lys Pro Phe Gly Leu Arg Ser Lys Met
                    1060                  1065                  1070
    Gly Lys Trp Cys Cys Arg Cys Phe Pro Cys Cys Arg Glu Ser Gly Lys
                    1075                  1080                  1085
    Ser Asn Val Gly Thr Ser Gly Asp His Asp Asp Ser Ala Met Lys Thr
               1090                  1095                  1100
    Leu Arg Ser Lys Met Gly Lys Trp Cys Arg His Cys Phe Pro Cys Cys
    1105                  1110                  1115                  112
    Arg Gly Ser Gly Lys Ser Asn Val Gly Ala Ser Gly Asp His Asp Asp
                    1125                  1130                  1135
    Ser Ala Met Lys Thr Leu Arg Asn Lys Met Gly Lys Trp Cys Cys His
                    1140                  1145                  1150
    Cys Phe Pro Cys Cys Arg Gly Ser Gly Lys Ser Lys Val Gly Ala Trp
                    1155                  1160                  1165
    Gly Asp Tyr Asp Asp Ser Ala Phe Met Glu Pro Arg Tyr His Val Arg
               1170                  1175                  1180
    Gly Glu Asp Leu Asp Lys Leu His Arg Ala Ala Trp Trp Gly Lys Val
    1185                  1190                  1195                  120
    Pro Arg Lys Asp Leu Ile Val Met Leu Arg Asp Thr Asp Val Asn Lys
                    1205                  1210                  1215
    Lys Asp Lys Gln Lys Arg Thr Ala Leu His Leu Ala Ser Ala Asn Gly
                    1220                  1225                  1230
    Asn Ser Glu Val Val Lys Leu Leu Leu Asp Arg Arg Cys Gln Leu Asn
                    1235                  1240                  1245
    Val Leu Asp Asn Lys Lys Arg Thr Ala Leu Ile Lys Ala Val Gln Cys
    1250                  1255                  1260
    Gln Glu Asp Glu Cys Ala Leu Met Leu Leu Glu His Gly Thr Asp Pro
    1265                  1270                  1275                  128
    Asn Ile Pro Asp Glu Tyr Gly Asn Thr Thr Leu His Tyr Ala Ile Tyr
                    1285                  1290                  1295
    Asn Glu Asp Lys Leu Met Ala Lys Ala Leu Leu Leu Tyr Gly Ala Asp
                    1300                  1305                  1310
    Ile Glu Ser Lys Asn Lys His Gly Leu Thr Pro Leu Leu Leu Gly Val
                    1315                  1320                  1325
    His Glu Gln Lys Gln Gln Val Val Lys Phe Leu Ile Lys Lys Lys Ala
                    1330                  1335                  1340
    Asn Leu Asn Ala Leu Asp Arg Tyr Gly Arg Thr Ala Leu Ile Leu Ala
    1345                  1350                  1355                  136
    Val Cys Cys Gly Ser Ala Ser Ile Val Ser Leu Leu Leu Glu Gln Asn
                    1365                  1370                  1375
    Ile Asp Val Ser Ser Gln Asp Leu Ser Gly Gln Thr Ala Arg Glu Tyr
                    1380                  1385                  1390
    Ala Val Ser Ser His His His Val Ile Cys Gln Leu Leu Ser Asp Tyr
                    1395                  1400                  1405
```

Lys Glu Lys Gln Met Leu Lys Ile Ser Ser Glu Asn Ser Asn Pro Glu
    1410   1415   1420
Gln Asp Leu Lys Leu Thr Ser Glu Glu Ser Gln Arg Phe Lys Gly
1425   1430   1435   144
Ser Glu Asn Ser Gln Pro Glu Lys Met Ser Gln Glu Pro Glu Ile Asn
            1445   1450   1455
Lys Asp Gly Asp Arg Glu Val Glu Glu Glu Met Lys Lys His Glu Ser
            1460   1465   1470
Asn Asn Val Gly Leu Leu Glu Asn Leu Thr Asn Gly Val Thr Ala Gly
        1475   1480   1485
Asn Gly Asp Asn Gly Leu Ile Pro Gln Arg Lys Ser Arg Thr Pro Glu
    1490   1495   1500
Asn Gln Gln Phe Pro Asp Asn Glu Ser Glu Glu Tyr His Arg Ile Cys
1505   1510   1515   152
Glu Leu Val Ser Asp Tyr Lys Glu Lys Gln Met Pro Lys Tyr Ser Ser
            1525   1530   1535
Glu Asn Ser Asn Pro Glu Gln Asp Leu Lys Leu Thr Ser Glu Glu Glu
            1540   1545   1550
Ser Gln Arg Leu Glu Gly Ser Glu Asn Gly Gln Pro Glu Lys Arg Ser
        1555   1560   1565
Gln Glu Pro Glu Ile Asn Lys Asp Gly Asp Arg Glu Leu Glu Asn Phe
    1570   1575   1580
Met Ala Ile Glu Glu Met Lys Lys His Gly Ser Thr His Val Gly Phe
1585   1590   1595   160
Pro Glu Asn Leu Thr Asn Gly Ala Thr Ala Gly Asn Gly Asp Asp Gly
            1605   1610   1615
Leu Ile Pro Pro Arg Lys Ser Arg Thr Pro Glu Ser Gln Gln Phe Pro
        1620   1625   1630
Asp Thr Glu Asn Glu Glu Tyr His Ser Asp Glu Gln Asn Asp Thr Gln
        1635   1640   1645
Lys Gln Phe Cys Glu Glu Gln Asn Thr Gly Ile Leu His Asp Glu Ile
    1650   1655   1660
Leu Ile His Glu Glu Lys Gln Ile Glu Val Val Glu Lys Met Asn Ser
1665   1670   1675   168
Glu Leu Ser Leu Ser Cys Lys Lys Glu Lys Asp Ile Leu His Glu Asn
            1685   1690   1695
Ser Thr Leu Arg Glu Glu Ile Ala Met Leu Arg Leu Glu Leu Asp Thr
            1700   1705   1710
Met Lys His Gln Ser Gln Leu
        1715

        <210> 379
        <211> 656
        <212> PRT
        <213> Homo sapien

        <400> 379
Met Val Val Glu Val Asp Ser Met Pro Ala Ala Ser Ser Val Lys Lys
1   5   10   15
Pro Phe Gly Leu Arg Ser Lys Met Gly Lys Trp Cys Cys Arg Cys Phe
            20   25   30
Pro Cys Cys Arg Glu Ser Gly Lys Ser Asn Val Gly Thr Ser Gly Asp
            35   40   45
His Asp Asp Ser Ala Met Lys Thr Leu Arg Ser Lys Met Gly Lys Trp
    50   55   60

```
Cys Arg His Cys Phe Pro Cys Cys Arg Gly Ser Gly Lys Ser Asn Val
65              70              75                      80
Gly Ala Ser Gly Asp His Asp Asp Ser Ala Met Lys Thr Leu Arg Asn
            85              90                      95
Lys Met Gly Lys Trp Cys Cys His Cys Phe Pro Cys Cys Arg Gly Ser
            100             105             110
Gly Lys Ser Lys Val Gly Ala Trp Gly Asp Tyr Asp Asp Ser Ala Phe
        115             120             125
Met Glu Pro Arg Tyr His Val Arg Gly Glu Asp Leu Asp Lys Leu His
    130             135             140
Arg Ala Ala Trp Trp Gly Lys Val Pro Arg Lys Asp Leu Ile Val Met
145             150             155             160
Leu Arg Asp Thr Asp Val Asn Lys Lys Asp Lys Gln Lys Arg Thr Ala
            165             170             175
Leu His Leu Ala Ser Ala Asn Gly Asn Ser Glu Val Val Lys Leu Leu
        180             185             190
Leu Asp Arg Arg Cys Gln Leu Asn Val Leu Asp Asn Lys Lys Arg Thr
        195             200             205
Ala Leu Ile Lys Ala Val Gln Cys Gln Glu Asp Glu Cys Ala Leu Met
    210             215             220
Leu Leu Glu His Gly Thr Asp Pro Asn Ile Pro Asp Glu Tyr Gly Asn
225             230             235             240
Thr Thr Leu His Tyr Ala Ile Tyr Asn Glu Asp Lys Leu Met Ala Lys
            245             250             255
Ala Leu Leu Leu Tyr Gly Ala Asp Ile Glu Ser Lys Asn Lys His Gly
            260             265             270
Leu Thr Pro Leu Leu Leu Gly Val His Glu Gln Lys Gln Gln Val Val
        275             280             285
Lys Phe Leu Ile Lys Lys Lys Ala Asn Leu Asn Ala Leu Asp Arg Tyr
    290             295             300
Gly Arg Thr Ala Leu Ile Leu Ala Val Cys Cys Gly Ser Ala Ser Ile
305             310             315             320
Val Ser Leu Leu Leu Glu Gln Asn Ile Asp Val Ser Ser Gln Asp Leu
            325             330             335
Ser Gly Gln Thr Ala Arg Glu Tyr Ala Val Ser Ser His His His Val
            340             345             350
Ile Cys Gln Leu Leu Ser Asp Tyr Lys Glu Lys Gln Met Leu Lys Ile
        355             360             365
Ser Ser Glu Asn Ser Asn Pro Glu Gln Asp Leu Lys Leu Thr Ser Glu
    370             375             380
Glu Glu Ser Gln Arg Phe Lys Gly Ser Glu Asn Ser Gln Pro Glu Lys
385             390             395             400
Met Ser Gln Glu Pro Glu Ile Asn Lys Asp Gly Asp Arg Glu Val Glu
            405             410             415
Glu Glu Met Lys Lys His Glu Ser Asn Asn Val Gly Leu Leu Glu Asn
            420             425             430
Leu Thr Asn Gly Val Thr Ala Gly Asn Gly Asp Asn Gly Leu Ile Pro
        435             440             445
Gln Arg Lys Ser Arg Thr Pro Glu Asn Gln Gln Phe Pro Asp Asn Glu
    450             455             460
Ser Glu Glu Tyr His Arg Ile Cys Glu Leu Val Ser Asp Tyr Lys Glu
465             470             475             480
Lys Gln Met Pro Lys Tyr Ser Ser Glu Asn Ser Asn Pro Glu Gln Asp
            485             490             495
Leu Lys Leu Thr Ser Glu Glu Glu Ser Gln Arg Leu Glu Gly Ser Glu
```

```
                    500                  505                  510
Asn Gly Gln Pro Glu Leu Glu Asn Phe Met Ala Ile Glu Glu Met Lys
          515                  520                  525
Lys His Gly Ser Thr His Val Gly Phe Pro Glu Asn Leu Thr Asn Gly
      530                  535                  540
Ala Thr Ala Gly Asn Gly Asp Asp Gly Leu Ile Pro Pro Arg Lys Ser
545                  550                  555                  560
Arg Thr Pro Glu Ser Gln Gln Phe Pro Asp Thr Glu Asn Glu Glu Tyr
                565                  570                  575
His Ser Asp Glu Gln Asn Asp Thr Gln Lys Gln Phe Cys Glu Glu Gln
              580                  585                  590
Asn Thr Gly Ile Leu His Asp Glu Ile Leu Ile His Glu Glu Lys Gln
          595                  600                  605
Ile Glu Val Val Glu Lys Met Asn Ser Glu Leu Ser Leu Ser Cys Lys
      610                  615                  620
Lys Glu Lys Asp Ile Leu His Glu Asn Ser Thr Leu Arg Glu Glu Ile
625                  630                  635                  640
Ala Met Leu Arg Leu Glu Leu Asp Thr Met Lys His Gln Ser Gln Leu
              645                  650                  655
```

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        <210> 380
        <211> 671
        <212> PRT
        <213> Homo sapien

        <400> 380
Met Val Val Glu Val Asp Ser Met Pro Ala Ala Ser Ser Val Lys Lys
1                   5                   10                  15
Pro Phe Gly Leu Arg Ser Lys Met Gly Lys Trp Cys Cys Arg Cys Phe
                20                  25                  30
Pro Cys Cys Arg Glu Ser Gly Lys Ser Asn Val Gly Thr Ser Gly Asp
          35                  40                  45
His Asp Asp Ser Ala Met Lys Thr Leu Arg Ser Lys Met Gly Lys Trp
      50                  55                  60
Cys Arg His Cys Phe Pro Cys Cys Arg Gly Ser Gly Lys Ser Asn Val
65                  70                  75                  80
Gly Ala Ser Gly Asp His Asp Asp Ser Ala Met Lys Thr Leu Arg Asn
                85                  90                  95
Lys Met Gly Lys Trp Cys Cys His Cys Phe Pro Cys Cys Arg Gly Ser
              100                 105                 110
Gly Lys Ser Lys Val Gly Ala Trp Gly Asp Tyr Asp Asp Ser Ala Phe
          115                 120                 125
Met Glu Pro Arg Tyr His Val Arg Gly Glu Asp Leu Asp Lys Leu His
      130                 135                 140
Arg Ala Ala Trp Trp Gly Lys Val Pro Arg Lys Asp Leu Ile Val Met
145                 150                 155                 160
Leu Arg Asp Thr Asp Val Asn Lys Lys Asp Lys Gln Lys Arg Thr Ala
                165                 170                 175
Leu His Leu Ala Ser Ala Asn Gly Asn Ser Glu Val Val Lys Leu Leu
              180                 185                 190
Leu Asp Arg Arg Cys Gln Leu Asn Val Leu Asp Asn Lys Lys Arg Thr
          195                 200                 205
Ala Leu Ile Lys Ala Val Gln Cys Gln Glu Asp Glu Cys Ala Leu Met
      210                 215                 220
Leu Leu Glu His Gly Thr Asp Pro Asn Ile Pro Asp Glu Tyr Gly Asn
```

```
      225                     230                     235                          240
Thr  Thr  Leu  His  Tyr  Ala  Ile  Tyr  Asn  Glu  Asp  Lys  Leu  Met  Ala  Lys
                 245                     250                          255
Ala  Leu  Leu  Leu  Tyr  Gly  Ala  Asp  Ile  Glu  Ser  Lys  Asn  Lys  His  Gly
                 260                     265                          270
Leu  Thr  Pro  Leu  Leu  Leu  Gly  Val  His  Glu  Gln  Lys  Gln  Gln  Val  Val
                 275                     280                          285
Lys  Phe  Leu  Ile  Lys  Lys  Ala  Asn  Leu  Asn  Ala  Leu  Asp  Arg  Tyr
      290                     295                     300
Gly  Arg  Thr  Ala  Leu  Ile  Leu  Ala  Val  Cys  Cys  Gly  Ser  Ala  Ser  Ile
      305                     310                     315                     320
Val  Ser  Leu  Leu  Leu  Glu  Gln  Asn  Ile  Asp  Val  Ser  Ser  Gln  Asp  Leu
                 325                     330                          335
Ser  Gly  Gln  Thr  Ala  Arg  Glu  Tyr  Ala  Val  Ser  Ser  His  His  His  Val
                 340                     345                          350
Ile  Cys  Gln  Leu  Leu  Ser  Asp  Tyr  Lys  Glu  Lys  Gln  Met  Leu  Lys  Ile
                 355                     360                          365
Ser  Ser  Glu  Asn  Ser  Asn  Pro  Glu  Gln  Asp  Leu  Lys  Leu  Thr  Ser  Glu
                 370                     375                          380
Glu  Glu  Ser  Gln  Arg  Phe  Lys  Gly  Ser  Glu  Asn  Ser  Gln  Pro  Glu  Lys
      385                     390                     395                     400
Met  Ser  Gln  Glu  Pro  Glu  Ile  Asn  Lys  Asp  Gly  Asp  Arg  Glu  Val  Glu
                 405                     410                          415
Glu  Glu  Met  Lys  Lys  His  Glu  Ser  Asn  Asn  Val  Gly  Leu  Leu  Glu  Asn
                 420                     425                          430
Leu  Thr  Asn  Gly  Val  Thr  Ala  Gly  Asn  Gly  Asp  Asn  Gly  Leu  Ile  Pro
                 435                     440                          445
Gln  Arg  Lys  Ser  Arg  Thr  Pro  Glu  Asn  Gln  Gln  Phe  Pro  Asp  Asn  Glu
      450                     455                     460
Ser  Glu  Glu  Tyr  His  Arg  Ile  Cys  Glu  Leu  Val  Ser  Asp  Tyr  Lys  Glu
      465                     470                     475                     480
Lys  Gln  Met  Pro  Lys  Tyr  Ser  Ser  Glu  Asn  Ser  Asn  Pro  Glu  Gln  Asp
                 485                     490                          495
Leu  Lys  Leu  Thr  Ser  Glu  Glu  Glu  Ser  Gln  Arg  Leu  Glu  Gly  Ser  Glu
                 500                     505                          510
Asn  Gly  Gln  Pro  Glu  Lys  Arg  Ser  Gln  Glu  Pro  Glu  Ile  Asn  Lys  Asp
                 515                     520                          525
Gly  Asp  Arg  Glu  Leu  Glu  Asn  Phe  Met  Ala  Ile  Glu  Glu  Met  Lys  Lys
      530                     535                     540
His  Gly  Ser  Thr  His  Val  Gly  Phe  Pro  Glu  Asn  Leu  Thr  Asn  Gly  Ala
      545                     550                     555                     560
Thr  Ala  Gly  Asn  Gly  Asp  Asp  Gly  Leu  Ile  Pro  Pro  Arg  Lys  Ser  Arg
                 565                     570                          575
Thr  Pro  Glu  Ser  Gln  Gln  Phe  Pro  Asp  Thr  Glu  Asn  Glu  Glu  Tyr  His
                 580                     585                          590
Ser  Asp  Glu  Gln  Asn  Asp  Thr  Gln  Lys  Gln  Phe  Cys  Glu  Glu  Gln  Asn
                 595                     600                          605
Thr  Gly  Ile  Leu  His  Asp  Glu  Ile  Leu  Ile  His  Glu  Glu  Lys  Gln  Ile
                 610                     615                          620
Glu  Val  Val  Glu  Lys  Met  Asn  Ser  Glu  Leu  Ser  Leu  Ser  Cys  Lys  Lys
      625                     630                     635                     640
Glu  Lys  Asp  Ile  Leu  His  Glu  Asn  Ser  Thr  Leu  Arg  Glu  Glu  Ile  Ala
                 645                     650                          655
Met  Leu  Arg  Leu  Glu  Leu  Asp  Thr  Met  Lys  His  Gln  Ser  Gln  Leu
                 660                     665                          670
```

<210> 381
<211> 251
<212> DNA
<213> Homo sapien

<400> 381

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ggagaagcgt ctgctggggc aggaaggggt ttccctgccc tctcacctgt ccctcaccaa     60
ggtaacatgc ttcccctaag ggtatcccaa cccagggggcc tcaccatgac ctctgagggg    120
ccaatatccc aggagaagca ttggggagtt gggggcaggt gaaggaccca ggactcacac    180
atcctgggcc tccaaggcag aggagagggt cctcaagaag gtcaggagga aaatccgtaa    240
caagcagtca g                                                          251
```

<210> 382
<211> 3279
<212> DNA
<213> Homo sapiens

<400> 382

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cttcctgcag ccccccatgct ggtgaggggc acgggcagga acagtggacc caacatggaa     60
atgctggagg gtgtcaggaa gtgatcgggc tctggggcag ggaggagggg tggggagtgt    120
cactgggagg ggacatcctg cagaaggtag gagtgagcaa acacccgctg caggggaggg    180
gagagccctg cggcacctgg gggagcagag ggagcagcac ctgcccaggc ctgggaggag    240
gggcctggag ggcgtgagga ggagcgaggg ggctgcatgg ctggagtgag ggatcagggg    300
cagggcgcga gatggcctca cacagggaag agagggcccc tcctgcaggg cctcacctgg    360
gccacaggag gacactgctt ttcctctgag gagtcaggag ctgtggatgg tgctggacag    420
aagaaggaca gggcctggct caggtgtcca gaggctgtcg ctggcttccc tttgggatca    480
gactgcaggg agggagggcg gcagggttgt ggggggagtg acgatgagga tgacctgggg    540
gtggctccag gccttgcccc tgcctgggcc ctcacccagc ctccctcaca gtctcctggc    600
cctcagtctc tcccctccac tccatcctcc atctggcctc agtgggtcat tctgatcact    660
gaactgacca tacccagccc tgcccacggc cctccatggc tccccaatgc cctggagagg    720
ggacatctag tcagagagta gtcctgaaga ggtggcctct gcgatgtgcc tgtgggggca    780
gcatcctgca gatggtcccg gccctcatcc tgctgacctg tctgcaggga ctgtcctcct    840
ggaccttgcc ccttgtgcag gagctggacc ctgaagtccc ctccccatag gccaagactg    900
gagccttgtt ccctctgttg gactccctgc ccatattctt gtgggagtgg gttctggaga    960
catttctgtc tgttcctgag agctgggaat tgctctcagt catctgcctg cgcggttctg   1020
agagatggag ttgcctaggc agttattggg gccaatcttt ctcactgtgt ctctcctcct   1080
ttaccccttag ggtgattctg ggggtccact tgtctgtaat ggtgtgcttc aaggtatcac   1140
atcatggggc cctgagccat gtgccctgcc tgaaaagcct gctgtgtaca ccaaggtggt   1200
gcattaccgg aagtggatca aggacaccat cgcagccaac ccctgagtgc ccctgtccca   1260
cccctacctc tagtaaattt aagtccacct cacgttctgg catcacttgg cctttctgga   1320
tgctggacac ctgaagcttg gaactcacct ggccgaagct cgagcctcct gagtcctact   1380
gacctgtgct ttctggtgtg gagtccaggg ctgctaggaa aaggaatggg cagacacagg   1440
tgtatgccaa tgtttctgaa atgggtataa tttcgtcctc ccttcggaa cactggctgt   1500
ctctgaagac ttctcgctca gtttcagtga ggacacacac aaagacgtgg gtgaccatgt   1560
tgtttgtggg gtgcagagat gggaggggtg gggcccaccc tggaagagtg acagtgaca   1620
caaggtggac actctctaca gatcactgag gataagctgg agccacaatg catgaggcac   1680
acacacagca aggttgacgc tgtaaacata gcccacgctg tcctggggggc actgggaagc   1740
ctagataagg ccgtgagcag aaagaagggg aggatcctcc tatgttgttg aaggagggac   1800
taggggagaa aactgaaagc tgattaatta caggaggttt gttcaggtcc cccaaaccac   1860
cgtcagattt gatgatttcc tagcaggact tacagaaata aagagctatc atgctgtggt   1920
ttattatggt ttgttacatt gataggatac atactgaaat cagcaaacaa aacagatgta   1980
tagattagag tgtggagaaa acagaggaaa acttgcagtt acgaagactg caacttggc   2040
tttactaagt tttcagactg gcaggaagtc aaacctatta ggctgaggac cttgtggagt   2100
gtagctgatc cagctgatag aggaactagc caggtggggg cctttccctt tggatggggg   2160
```

```
gcatatccga cagttattct ctccaagtgg agacttacgg acagcatata attctccctg 2220
caaggatgta tgataatatg tacaaagtaa ttccaactga ggaagctcac ctgatcctta 2280
gtgtccaggg tttttactgg gggtctgtag gacgagtatg gagtacttga ataattgacc 2340
tgaagtcctc agacctgagg ttccctagag ttcaaacaga tacagcatgg tccagagtcc 2400
cagatgtaca aaaacaggga ttcatcacaa atcccatctt tagcatgaag ggtctggcat 2460
ggcccaaggc cccaagtata tcaaggcact tgggcagaac atgccaagga atcaaatgtc 2520
atctcccagg agttattcaa gggtgagccc tttacttggg atgtacaggc tttgagcagt 2580
gcagggctgc tgagtcaacc tttttattgta caggggatga gggaaaggga gaggatgagg 2640
aagccccct ggggatttgg tttggtcttg tgatcaggtg gtctatgggg ctatccctac 2700
aaagaagaat ccagaaatag gggcacattg aggaatgata ctgagcccaa agagcattca 2760
atcattgttt tatttgcctt cttttcacac cattggtgag ggagggatta ccaccctggg 2820
gttatgaaga tggttgaaca ccccacacat agcaccggag atatgagatc aacagtttct 2880
tagccataga gattcacagc ccagagcagg aggacgctgc acaccatgca ggatgacatg 2940
ggggatgcgc tcgggattgg tgtgaagaag caaggactgt tagaggcagg ctttatagta 3000
acaagacggt ggggcaaact ctgatttccg tggggggaatg tcatggtctt gctttactaa 3060
gttttgagac tggcaggtag tgaaactcat taggctgaga accttgtgga atgcagctga 3120
cccagctgat agaggaagta gccaggtggg agcctttccc agtgggtgtg ggacatatct 3180
ggcaagattt tgtggcactc ctggttacag atactggggc agcaaataaa actgaatctt 3240
gttttcagac cttaaaaaaa aaaaaaaaaa aaaagtttt              3279
```

<210> 383
<211> 155
<212> PRT
<213> Homo sapiens

<400> 383
Met Ala Gly Val Arg Asp Gln Gly Gln Gly Ala Arg Trp Pro His Thr
                    5   10   15

Gly Lys Arg Gly Pro Leu Leu Gln Gly Leu Thr Trp Ala Thr Gly Gly
                20   25   30

His Cys Phe Ser Ser Glu Glu Ser Gly Ala Val Asp Gly Ala Gly Gln
            35   40   45

Lys Lys Asp Arg Ala Trp Leu Arg Cys Pro Glu Ala Val Ala Gly Phe
        50   55   60

Pro Leu Gly Ser Asp Cys Arg Glu Gly Gly Arg Gln Gly Cys Gly Gly
    65   70   75   80

Ser Asp Asp Glu Asp Asp Leu Gly Val Ala Pro Gly Leu Ala Pro Ala
                    85   90   95

Trp Ala Leu Thr Gln Pro Pro Ser Gln Ser Pro Gly Pro Gln Ser Leu
                100   105   110

Pro Ser Thr Pro Ser Ser Ile Trp Pro Gln Trp Val Ile Leu Ile Thr
            115   120   125

Glu Leu Thr Ile Pro Ser Pro Ala His Gly Pro Pro Trp Leu Pro Asn
        130   135   140

Ala Leu Glu Arg Gly His Leu Val Arg Glu
145   150

```
<210> 384
<211> 557
<212> DNA
<213> Homo sapiens

<400> 384
ggatcctcta gagcggccgc ctactactac taaattcgcg gccgcgtcga cgaagaagag 60
aaagatgtgt tttgttttgg actctctgtg gtcccttcca atgctgtggg tttccaacca 120
ggggaagggt cccttttgca ttgccaagtg ccataaccat gagcactact ctaccatggt 180
tctgcctcct ggccaagcag gctggtttgc aagaatgaaa tgaatgattc tacagctagg 240
acttaacctt gaaatggaaa gtcttgcaat cccatttgca ggatccgtct gtgcacatgc 300
ctctgtagag agcagcattc ccagggacct tggaaacagt tggcactgta aggtgcttgc 360
tccccaagac acatcctaaa aggtgttgta atggtgaaaa cgtcttcctt ctttattgcc 420
ccttcttatt tatgtgaaca actgtttgtc ttttttgta tcttttttaa actgtaaagt 480
tcaattgtga aaatgaatat catgcaaata aattatgcga ttttttttc aaagtaaaaa 540
aaaaaaaaaa aaaaaaa                                                   557

<210> 385
<211> 337
<212> DNA
<213> Homo sapiens

<400> 385
ttcccaggtg atgtgcgagg gaagacacat ttactatcct tgatggggct gattcctttа 60
gtttctctag cagcagatgg gttaggagga agtgacccaa gtggttgact cctatgtgca 120
tctcaaagcc atctgctgtc ttcgagtacg gacacatcat cactcctgca ttgttgatca 180
aaacgtggag gtgcttttcc tcagctaaga agcccttagc aaaagctcga atagacttag 240
tatcagacag gtccagtttc cgcaccaaca cctgctggtt ccctgtcgtg gtctggatct 300
ctttggccac caattccccc ttttccacat cccggca                             337

<210> 386
<211> 300
<212> DNA
<213> Homo sapiens

<400> 386
gggcccgcta ccggcccagg ccccgcctcg cgagtcctcc tccccgggtg cctgcccgca 60
gcccgctcgg cccagagggt gggcgcgggg ctgcctctac cggctggcgg ctgtaactca 120
gcgaccttgg cccgaaggct ctagcaagga cccaccgacc ccagccgcgg cggcggcggc 180
gcggactttg cccggtgtgt ggggcggagc ggactgcgtg tccgcggacg ggcagcgaag 240
atgttagcct tcgctgccag gaccgtggac cgatcccagg gctgtggtgt aacctcagcc 300

<210> 387
<211> 537
<212> DNA
<213> Homo sapiens

<400> 387
gggccgagtc gggcaccaag ggactctttg caggcttcct tcctcggatc atcaaggctg 60
ccccctcctg tgccatcatg atcagcacct atgagttcgg caaaagcttc ttccagaggc 120
tgaaccagga ccggcttctg ggcggctgaa aggggcaagg aggcaaggac cccgtctctc 180
ccacggatgg ggagagggca ggaggagacc cagccaagtg ccttttcctc agcactgagg 240
gaggggggctt gtttcccttc cctcccggcg acaagctcca gggcagggct gtccctctgg 300
```

```
gcggcccagc acttcctcag acacaacttc ttcctgctgc tccagtcgtg gggatcatca 360
cttacccacc ccccaagttc aagaccaaat cttccagctg ccccccttcgt gtttccctgt 420
gtttgctgta gctgggcatg tctccaggaa ccaagaagcc ctcagcctgg tgtagtctcc 480
ctgacccttg ttaattcctt aagtctaaag atgatgaact caaaaaaaa aaaaaaa     537
```

<210> 388
<211> 520
<212> DNA
<213> Homo sapiens

<400> 388
```
aggataattt ttaaaccaat caaatgaaaa aaacaaacaa acaaaaaagg aaatgtcatg 60
tgaggttaaa ccagtttgca ttcccctaat gtggaaaaag taagaggact actcagcact 120
gtttgaagat tgcctcttct acagcttctg agaattgtgt tatttcactt gccaagtgaa 180
ggaccccctc cccaacatgc cccagcccac ccctaagcat ggtcccttgt caccaggcaa 240
ccaggaaact gctacttgtg gacctcacca gagaccagga gggtttggtt agctcacagg 300
acttcccca ccccagaaga ttagcatccc atactagact catactcaac tcaactaggc 360
tcatactcaa ttgatggtta ttagacaatt ccatttcttt ctggttatta taaacagaaa 420
atctttcctc ttctcattac cagtaaaggc tcttggtatc tttctgttgg aatgatttct 480
atgaacttgt cttattttaa tggtgggttt ttttctggt              520
```

<210> 389
<211> 365
<212> DNA
<213> Homo sapiens

<400> 389
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cgttgcccca gtttgacaga aggaaaggcg gagcttattc aaagtctaga gggagtggag 60
gagttaaggc tggatttcag atctgcctgg ttccagccgc agtgtgccct ctgctccccc 120
aacgactttc caaataatct caccagcgcc ttccagctca ggcgtcctag aagcgtcttg 180
aagcctatgg ccagctgtct ttgtgttccc tctcacccgc ctgtcctcac agctgagact 240
cccaggaaac cttcagacta ccttcctctg ccttcagcaa ggggcgttgc ccacattctc 300
tgagggtcag tggaagaacc tagactccca ttgctagagg tagaaagggg aagggtgctg 360
gggag                                                  365
```

<210> 390
<211> 221
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(221)
<223> n = A,T,C or G

<400> 390
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tgcctctcca tcctggcccc gacttctctg tcaggaaagt ggggatggac cccatctgca 60
tacacggntt ctcatgggtg tggaacatct ctgcttgcgg tttcaggaag gcctctggct 120
gctctangag tctgancnga ntcgttgccc cantntgaca naaggaaagg cggagcttat 180
tcaaagtcta gagggagtgg aggagttaag gctggatttc a           221
```

<210> 391
<211> 325
<212> DNA
<213> Homo sapiens

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<220>
<221> misc_feature
<222> (1)...(325)
<223> n = A,T,C or G

<400> 391
tggagcaggt cccgaggcct ccctagagcc tggggccgac tctgtgncga tgcangcttt 60
ctctcgcgcc cagcctggag ctgctcctgg catctaccaa caatcagncg aggcgagcag 120
tagccagggc actgctgcca acagccagtc cnnataccat catgtnaccc ggtgngctct 180
naanttngat ntccanagcc ctacccatcn tagttctgct ctcccaccgg ntaccagccc 240
cactgcccag gaatcctaca gccagtaccc tgtcccgacg tctctaccta ccagtacgat 300
gagacctccg gctactacta tgacc                                     325


<210> 392
<211> 277
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(277)
<223> n = A,T,C or G

<400> 392
atattgttta actccttcct ttatatcttt taacattttc atggngaaag gttcacatct 60
agtctcactt nggcnagngn ctcctacttg agtctcttcc ccggcctgnn ccagtngnaa 120
antaccanga accgncatgn cttaanaacn ncctggtttn tgggttnntc aatgactgca 180
tgcagtgcac caccctgtcc actacgtgat gctgtaggat taaagtctca cagtgggcgg 240
ctgaggatac agcgccgcgt cctgtgttgc tggggaa                        277


<210> 393
<211> 566
<212> DNA
<213> Homo sapiens

<400> 393
actagtccag tgtggtggaa ttcgcggccg cgtcgacgga caggtcagct gtctggctca 60
gtgatctaca ttctgaagtt gtctgaaaat gtcttcatga ttaaattcag cctaaacgtt 120
ttgccgggaa cactgcagag acaatgctgt gagtttccaa ccttagccca tctgcgggca 180
gagaaggtct agtttgtcca tcagcattat catgatatca ggactggtta cttggttaag 240
gaggggtcta ggagatctgt ccctttaga gacaccttac ttataatgaa gtatttggga 300
gggtggtttt caaaagtaga aatgtcctgt attccgatga tcatcctgta aacattttat 360
catttattaa tcatccctgc ctgtgtctat tattatattc atatctctac gctggaaact 420
ttctgcctca atgtttactg tgcctttgtt tttgctagtt tgtgttgttg aaaaaaaaaa 480
cattctctgc ctgagtttta attttgtcc aaagttattt taatctatac aattaaaagc 540
ttttgcctat caaaaaaaaa aaaaaa                                    566


<210> 394
<211> 384
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
```

<222> (1)...(384)
<223> n = A,T,C or G

<400> 394
gaacatacat gtcccggcac ctgagctgca gtctgacatc atcgccatca cgggcctcgc 60
tgcaaattng gaccgggcca aggctggact gctggagcgt gtgaaggagc tacaggccna 120
gcaggaggac cgggctttaa ggagtttaa gctgagtgtc actgtagacc ccaaataccaa 180
tcccaagatt atcgggagaa agggggcagt aattacccaa atccggttgg agcatgacgt 240
gaacatccag tttcctgata aggacgatgg gaaccagccc caggaccaaa ttaccatcac 300
agggtacgaa aagaacacag aagctgccag ggatgctata ctgagaattg tgggtgaact 360
tgagcagatg gtttctgagg acgt   384

<210> 395
<211> 399
<212> DNA
<213> Homo sapiens

<400> 395
ggcaaaactg tgtgacctca ataagacctc gcagatccaa ggtcaagtat cagaagtgac 60
tctgaccttg gactccaaga cctacatcaa cagcctggct atattagatg atgagccagt 120
tatcagaggt ttcatcattg cggaaattgt ggagtctaag gaaatcatgg cctctgaagt 180
attcacgtct ttccagtacc ctgagttctc tatagagttg cctaacacag gcagaattgg 240
ccagctactt gtctgcaatt gtatcttcaa gaatacccctg gccatccctt tgactgacgt 300
caagttctct ttggaaagcc tgggcatctc ctcactacag acctctgacc atgggacggt 360
gcagcctggt gagaccatcc aatcccaaat aaaatgcac   399

<210> 396
<211> 403
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(403)
<223> n = A,T,C or G

<400> 396
tggagttntc agtgcaaaca agccataaag cttcagtagc aaattactgt ctcacagaaa 60
gacattttca acttctgctc cagctgctga taaaacaaat catgtgttta gcttgactcc 120
agacaaggac aacctgttcc ttcataactc tctagagaaa aaaggagtt gttagtagat 180
actaaaaaaa gtggatgaat aatctggata tttttcctaa aaagattcct tgaaacacat 240
taggaaaatg gagggcctta tgatcagaat gctagaatta gtccattgtg ctgaagcagg 300
gtttagggga gggagtgagg gataaaagaa ggaaaaaag aagagtgaga aaacctattt 360
atcaaagcag gtgctatcac tcaatgttag gccctgctct ttt   403

<210> 397
<211> 100
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(100)
<223> n = A,T,C or G

<400> 397
actagtncag tgtggtggaa ttcgcggccg cgtcgaccta naanccatct ctatagcaaa 60
tccatccccg ctcctggttg gtnacagaat gactgacaaa   100

<210> 398
<211> 278
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(278)
<223> n = A,T,C or G

<400> 398
gcggccgcgt cgacagcagt tccgccagcg ctcgcccctg ggtggggatg tgctgcacgc 60
ccacctggac atctggaagt cagcggcctg gatgaaagag cggacttcac ctggggcgat 120
tcactactgt gcctcgacca gtgaggagag ctggaccgac agcgaggtgg actcatcatg 180
ctccgggcag cccatccacc tgtggcagtt cctcaaggag ttgctactca agccccacag 240
ctatggccgc ttcattangt ggctcaacaa ggagaagg   278

<210> 399
<211> 298
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(298)
<223> n = A,T,C or G

<400> 399
acggaggtgg aggaagcgnc cctgggatcg anaggatggg tcctgncatt gaccncctcn 60
ggggtgccng catggagcgc atgggcgcgg gcctgggcca cggcatggat cgcgtgggct 120
ccgagatcga gcgcatgggc ctggtcatgg accgcatggg ctccgtggag cgcatgggct 180
ccggcattga gcgcatgggc ccgctgggcc tcgaccacat ggcctccanc attgancgca 240
tgggccagac catggagcgc attggctctg gcgtggagcn catgggtgcc ggcatggg   298

<210> 400
<211> 548
<212> DNA
<213> Homo sapiens

<400> 400
acatcaacta cttcctcatt ttaaggtatg gcagttccct tcatcccctt ttcctgcctt 60
gtacatgtac atgtatgaaa tttccttctc ttaccgaact ctctccacac atcacaaggt 120
caaagaacca cacgcttaga agggtaagag ggcaccctat gaaatgaaat ggtgatttct 180
tgagtctctt ttttccacgt ttaaggggcc atggcaggac ttagagttgc gagttaagac 240
tgcagagggc tagagaatta tttcatacag gctttgaggc cacccatgtc acttatcccg 300
tataccctct caccatcccc ttgtctactc tgatgccccc aagatgcaac tgggcagcta 360
gttggcccca taattctggg cctttgttgt ttgtttttaat tacttgggca tcccaggaag 420
ctttccagtg atctcctacc atgggccccc ctcctgggat caagcccctc ccaggccctg 480
tccccagccc ctcctgcccc agcccacccg cttgccttgg tgctcagccc tcccattggg 540
agcaggtt   548

<210> 401
<211> 355
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(355)
<223> n = A,T,C or G

<400> 401
actgtttcca tgttatgttt ctacacattg ctacctcagt gctcctggaa acttagcttt 60
tgatgtctcc aagtagtcca ccttcattta actctttgaa actgtatcat ctttgccaag 120
taagagtggt ggcctatttc agctgctttg acaaaatgac tggctcctga cttaacgttc 180
tataaatgaa tgtgctgaag caaagtgccc atggtggcgg cgaagaagan aaagatgtgt 240
tttgttttgg actctctgtg gtcccttcca atgctgnggg tttccaacca ggggaagggt 300
cccttttgca ttgccaagtg ccataaccat gagcactact ctaccatggn tctgc   355

<210> 402
<211> 407
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(407)
<223> n = A,T,C or G

<400> 402
atggggcaag ctggataaag aaccaagacc cactggagta tgctgtcttc aagaaaccca 60
tctcacatgc ggtggcatac ataggctcaa aataaaggaa tggagaaaaa tatttcaagc 120
aaatggaaaa cagaaaaaag caggtgttgc actcctactt tctgacaaaa cagactatgc 180
gaataaagat aaaaaagaga aggacattac aaaggtggtc ctgacctttg ataaatctca 240
ttgcttgata ccaacctggg ctgttttaat tgcccaaacc aaaaggataa tttgctgagg 300
ttgtggagct tctcccctgc agagagtccc tgatctccca aaatttggtt gagatgtaag 360
gntgattttg ctgacaactc cttttctgaa gttttactca tttccaa   407

<210> 403
<211> 303
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(303)
<223> n = A,T,C or G

<400> 403
cagtatttat agccnaactg aaaagctagt agcaggcaag tctcaaatcc aggcaccaaa 60
tcctaagcaa gagccatggc atggtgaaaa tgcaaaagga gagtctggcc aatctacaaa 120
tagagaacaa gacctactca gtcatgaaca aaaaggcaga caccaacatg gatctcatgg 180
gggattggat attgtaatta tagagcagga agatgacagt gatcgtcatt tggcacaaca 240
tcttaacaac gaccgaaacc cattatttac ataaacctcc attcggtaac catgttgaaa 300
gga   303

```
<210> 404
<211> 225
<212> DNA
<213> Homo sapiens

<400> 404
aagtgtaact tttaaaaatt tagtggattt tgaaaattct tagaggaaag taaaggaaaa 60
attgttaatg cactcattta cctttacatg gtgaaagttc tctcttgatc ctacaaacag 120
acattttcca ctcgtgtttc catagttgtt aagtgtatca gatgtgttgg gcatgtgaat 180
ctccaagtgc ctgtgtaata aataaagtat ctttatttca ttcat            225


<210> 405
<211> 334
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(334)
<223> n = A,T,C or G

<400> 405
gagctgttat actgtgagtt ctactaggaa atcatcaaat ctgagggttg tctggaggac 60
ttcaatacac ctcccccat agtgaatcag cttccagggg gtccagtccc tctccttact 120
tcatccccat cccatgccaa aggaagaccc tccctccttg gctcacagcc ttctctaggc 180
ttcccagtgc ctccaggaca gagtgggtta tgttttcagc tccatccttg ctgtgagtgt 240
ctggtgcggt tgtgcctcca gcttctgctc agtgcttcat ggacagtgtc cagcccatgt 300
cactctccac tctctcanng tggatcccac ccct                       334


<210> 406
<211> 216
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(216)
<223> n = A,T,C or G

<400> 406
tttcatacct aatgagggag ttganatnac atnnaaccag gaaatgcatg gatctcaang 60
gaaacaaaca cccaataaac tcggagtggc agactgacaa ctgtgagaca tgcacttgct 120
acnaaacaca aatttnatgt tgcacccttg tttctacacc tgtgggttat gacaaagaca 180
actgccaaag aatnttcaag aaggaggact gccant                     216


<210> 407
<211> 413
<212> DNA
<213> Homo sapiens

<400> 407
gctgacttgc tagtatcatc tgcattcatt gaagcacaag aacttcatgc cttgactcat 60
gtaaatgcaa taggattaaa aaataaattt gatatcacat ggaaacagac aaaaaatatt 120
gtacaacatt gcacccagtg tcagattcta cacctggcca ctcaggaagc aagagttaat 180
cccagaggtc tatgtcctaa tgtgttatgg caaatggatg tcatgcacgt accttcattt 240
```

```
   ggaaaattgt catttgtcca tgtgacagtt gatacttatt cacatttcat atgggcaacc 300
   tgccagacag gagaaagtct tcccatgtta aaagacattt attatcttgt tttcctgtca 360
   tgggagttcc agaaaaagtt aaaacagaca atgggccagg ttctgtagta aag          413
```

```
<210> 408
<211> 183
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(183)
<223> n = A,T,C or G

<400> 408
ggagctngcc ctcaattcct ccatntctat gttancatat ttaatgtctt ttgnnattaa 60
tncttaacta gttaatcctt aaagggctan ntaatcctta actagtccct ccattgtgag 120
cattatcctt ccagtattcn ccttctnttt tatttactcc ttcctggcta cccatgtact 180
ntt                                                                 183
```

```
<210> 409
<211> 250
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(250)
<223> n = A,T,C or G

<400> 409
cccacgcatg ataagctctt tatttctgta agtcctgcta ggaaatcatc aaatctgacg 60
gtggtttggg ggacctgaac aaacctcctg taattaatca gctttcagtt tctcccccta 120
gtccctcctt caacaacata ggaggatcct cccettcttt ctgctcacgg ccttatctag 180
gcttcccagt gcccccagga cagcgtgggc tatgtttaca gcgcntcctt gctgggggggg 240
ggccntatgc                                                          250
```

```
<210> 410
<211> 306
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(306)
<223> n = A,T,C or G

<400> 410
ggctggtttg caagaatgaa atgaatgatt ctacagctag gacttaacct tgaaatggaa 60
agtcttgcaa tcccatttgc aggatccgtc tgtgcacatg cctctgtaga gagcagcatt 120
cccagggacc ttggaaacag ttggcactgt aaggtgcttg ctccccaaga cacatcctaa 180
aaggtgttgt aatggtgaaa accgcttcct tctttattgc cccttcttat ttatgtgaac 240
nactggttgg ctttttttgn atcttttta aactggaaag ttcaattgng aaaatgaata 300
tcntgc                                                              306
```

<210> 411
<211> 261
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(261)
<223> n = A,T,C or G

<400> 411
agagatattn cttaggtnaa agttcataga gttcccatga actatatgac tggccacaca 60
ggatcttttg tatttaagga ttctgagatt ttgcttgagc aggattagat aaggctgttc 120
tttaaatgtc tgaaatggaa cagatttcaa aaaaaaaccc cacaatctag ggtgggaaca 180
aggaaggaaa gatgtgaata ggctgatggg caaaaaacca atttacccat cagttccagc 240
cttctctcaa ggngaggcaa a 261

<210> 412
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 412
gttcaatgtt acctgacatt tctacaacac cccactcacc gatgtattcg ttgcccagtg 60
ggaacatacc agcctgaatt tggaaaaaat aattgtgttt cttgcccagg aaatactacg 120
actgactttg atggctccac aaacataacc cagtgtaaaa acagaagatg tggaggggag 180
ctgggagatt tcactgggta cattgaattc ccaaactacc cangcaatta cccagccaac 240
a 241

<210> 413
<211> 231
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(231)
<223> n = A,T,C or G

<400> 413
aactcttaca atccaagtga ctcatctgtg tgcttgaatc ctttccactg tctcatctcc 60
ctcatccaag tttctagtac cttctctttg ttgtgaagga taatcaaact gaacaacaaa 120
aagtttactc tcctcatttg gaacctaaaa actctcttct tcctgggtct gagggctcca 180
agaatccttg aatcanttct cagatcattg gggacaccan atcaggaacc t 231

<210> 414
<211> 234
<212> DNA
<213> Homo sapiens

<400> 414
actgtccatg aagcactgag cagaagctgg aggcacaacg caccagacac tcacagcaag 60
gatggagctg aaaacataac ccactctgtc ctggaggcac tgggaagcct agagaaggct 120
gtgagccaag gagggagggt cttcctttgg catgggatgg ggatgaagta aggagaggga 180
ctggaccccc tggaagctga ttcactatgg ggggaggtgt attgaagtcc tcca 234

<210> 415
<211> 217
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(217)
<223> n = A,T,C or G

<400> 415
gcataggatt aagactgagt atcttttcta cattctttta actttctaag gggcacttct 60
caaaacacag accaggtagc aaatctccac tgctctaagg ntctcaccac cactttctca 120
cacctagcaa tagtagaatt cagtcctact tctgaggcca gaagaatggt tcagaaaaat 180
antggattat aaaaaataac aattaagaaa aataatc 217

<210> 416
<211> 213
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(213)
<223> n = A,T,C or G

<400> 416
atgcatatnt aaagganact gcctcgcttt tagaagacat ctggnctgct ctctgcatga 60
ggcacagcag taaagctctt tgattcccag aatcaagaac tctccccttc agactattac 120
cgaatgcaag gtggttaatt gaaggccact aattgatgct caaatagaag gatattgact 180
atattggaac agatggagtc tctactacaa aag 213

<210> 417
<211> 303
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(303)
<223> n = A,T,C or G

<400> 417
nagtcttcag gcccatcagg gaagttcaca ctggagagaa gtcatacata tgtactgtat 60
gtgggaaagg ctttactctg agttcaaatc ttcaagccca tcagagagtc cacactggag 120
agaagccata caaatgcaat gagtgtggga agagcttcag gagggattcc cattatcaag 180
ttcatctagt ggtccacaca ggagagaaac cctataaatg tgagatatgt gggaagggct 240
tcantcaaag ttcgtatctt caaatccatc ngaaggncca cagtatanan aaaccttta 300
agt 303

<210> 418
<211> 328
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(328)
<223> n = A,T,C or G

<400> 418

```
tttttggcgg tggtggggca gggacgggac angagtctca ctctgttgcc caggctggag 60
tgcacaggca tgatctcggc tcactacaac ccctgcctcc catgtccaag cgattcttgt 120
gcctcagcct tccctgtagc tagaattaca ggcacatgcc accacaccca gctagttttt 180
gtattttag tagagacagg gtttcaccat gttggccagg ctggtctcaa actcctnacc 240
tcagnggtca ggctggtctc aaactcctga cctcaagtga tctgcccacc tcagcctccc 300
aaagtgctan gattacaggc cgtgagcc                                     328
```

<210> 419
<211> 389
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(389)
<223> n = A,T,C or G

<400> 419

```
cctcctcaag acggcctgtg gtccgcctcc cggcaaccaa gaagcctgca gtgccatatg 60
acccctgagc catggactgg agcctgaaag gcagcgtaca ccctgctcct gatcttgctg 120
cttgtttcct ctctgtggct ccattcatag cacagttgtt gcactgaggc ttgtgcaggc 180
cgagcaaggc caagctggct caaagagcaa ccagtcaact ctgccacggt gtgccaggca 240
ccggttctcc agccaccaac ctcactcgct cccgcaaatg gcacatcagt tcttctaccc 300
taaaggtagg accaaagggc atctgctttt ctgaagtcct ctgctctatc agccatcacg 360
tggcagccac tcnggctgtg tcgacgcgg                                    389
```

<210> 420
<211> 408
<212> DNA
<213> Homo sapiens

<400> 420

```
gttcctccta actcctgcca gaaacagctc tcctcaacat gagagctgca cccctcctcc 60
tggccagggc agcaagcctt agccttggct tcttgtttct gcttttttc tggctagacc 120
gaagtgtact agccaaggag ttgaagtttg tgactttggt gtttcggcat ggagaccgaa 180
gtcccattga cacctttccc actgacccca taaaggaatc ctcatggcca caaggatttg 240
gccaactcac ccagctgggc atggagcagc attatgaact tggagagtat ataagaaaga 300
gatatagaaa attcttgaat gagtcctata aacatgaaca ggtttatatt cgaagcacag 360
acgttgaccg gactttgatg aagtgctatg acaaacctgg caagcccg        408
```

<210> 421
<211> 352
<212> DNA

```
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(352)
<223> n = A,T,C or G

<400> 421
gctcaaaaat cttttttactg atnggcatgg ctacacaatc attgactatt acggaggcca 60
gaggagaatg aggcctggcc tgggagccct gtgcctacta naagcacatt agattatcca 120
ttcactgaca gaacaggtct tttttgggtc cttcttctcc accacnatat acttgcagtc 180
ctccttcttg aagattcttt ggcagttgtc tttgtcataa cccacaggtg tagaaacaag 240
ggtgcaacat gaaatttctg tttcgtagca agtgcatgtc tcacaagttg gcangtctgc 300
cactccgagt ttattgggtg tttgtttcct ttgagatcca tgcatttcct gg        352

<210> 422
<211> 337
<212> DNA
<213> Homo sapiens

<400> 422
atgccaccat gctggcaatg cagcgggcgg tcgaaggcct gcatatccag cccaagctgg 60
cgatgatcga cggcaaccgt tgcccgaagt tgccgatgcc agccgaagcg gtggtcaagg 120
gcgatagcaa ggtgccggcg atcgcggcgg cgtcaatcct ggccaaggtc agccgtgatc 180
gtgaaatggc agctgtcgaa ttgatctacc cgggttatgg catcggcggg cataagggct 240
atccgacacc ggtgcacctg gaagccttgc agcggctggg gccgacgccg attcaccgac 300
gcttcttccg ccggtacggc tggcctatga aaattat                         337

<210> 423
<211> 310
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(310)
<223> n = A,T,C or G

<400> 423
gctcaaaaat cttttttactg atatggcatg gctacacaat cattgactat tagaggccag 60
aggagaatga ggcctggcct gggagccctg tgcctactan aagcncatta gattatccat 120
tcactgacag aacaggtctt tttttgggtcc ttcttctcca ccacgatata cttgcagtcc 180
tccttcttga agattctttg gcagttgtct ttgtcataac ccacaggtgt anaaacaagt 240
gtgcaacatg aaatttctgt ttcgtagcaa gtgcatgtct cacagttgtc aagtctgccc 300
tccgagttta                                                      310

<210> 424
<211> 370
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(370)
<223> n = A,T,C or G
```

<400> 424
```
gctcaaaaat cttttactg ataggcatgg ctacacaatc attgactatt agaggccaga 60
ggagaatgag gcctggcctg ggagccctgt gcctactaga agcacattag attatccatt 120
cactgacaga acaggtcttt tttgggtcct tcttctccac cacgatatac ttgcagtcct 180
ccttcttgaa gattctttgg cagttgtctt tgtcataacc cacaggtgta gaaacatcct 240
ggttgaatct cctggaactc cctcattagg tatgaaatag catgatgcat tgcataaagt 300
cacgaaggtg gcaaagatca caacgctgcc cagganaaca ttcattgtga taagcaggac 360
tccgtcgacg                                                        370
```

<210> 425
<211> 216
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(216)
<223> n = A,T,C or G

<400> 425
```
aattgctatn ntttattttg ccactcaaaa taattaccaa aaaaaaaaaa tnttaaatga 60
taacaacnca acatcaaggn aaananaaca ggaatggntg actntgcata aatnggccga 120
anattatcca ttatnttaag ggttgacttc aggntacagc acacagacaa acatgcccag 180
gaggntntca ggaccgctcg atgtnttntg aggagg                           216
```

<210> 426
<211> 596
<212> DNA
<213> Homo sapiens

<400> 426
```
cttccagtga ggataaccct gttgccccgg gccgaggttc tccattaggc tctgattgat 60
tggcagtcag tgatggaagg gtgttctgat cattccgact gccccaaggg tcgctggcca 120
gctctctgtt ttgctgagtt ggcagtagga cctaatttgt taattaagag tagatggtga 180
gctgtccttg tattttgatt aacctaatgg ccttcccagc acgactcgga ttcagctgga 240
gacatcacgg caacttttaa tgaaatgatt tgaagggcca ttaagaggca cttcccgtta 300
ttaggcagtt catctgcact gataacttct tggcagctga gctggtcgga gctgtggccc 360
aaacgcacac ttggcttttg gttttgagat acaactctta atcttttagt catgcttgag 420
ggtggatggc cttttcagct ttaacccaat ttgcactgcc ttggaagtgt agccaggaga 480
atacactcat atactcgtgg gcttagaggc cacagcagat gtcattggtc tactgcctga 540
gtcccgctgg tcccatccca ggaccttcca tcggcgagta cctgggagcc cgtgct      596
```

<210> 427
<211> 107
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(107)
<223> n = A,T,C or G

<400> 427
```
gaagaattca agttaggttt attcaaaggg cttacngaga atcctanacc caggncccag 60
```

```
cccgggagca gccttanaga gctcctgttt gactgcccgg ctcagng                    107
```

```
<210> 428
<211> 38
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(38)
<223> n = A,T,C or G

<400> 428
gaacttccna anaangactt tattcactat tttacatt                              38
```

```
<210> 429
<211> 544
<212> DNA
<213> Homo sapiens

<400> 429
ctttgctgga cggaataaaa gtggacgcaa gcatgacctc ctgatgaggg cgctgcattt 60
attgaagagc ggctgcagcc ctgcggttca gattaaaatc cgagaattgt atagacgccg 120
atatccacga actcttgaag gactttctga tttatccaca atcaaatcat cggttttcag 180
tttggatggt ggctcatcac ctgtagaacc tgacttggcc gtggctggaa tccactcgtt 240
gccttccact tcagttacac ctcactcacc atcctctcct gttggttctg tgctgcttca 300
agatactaag cccacatttg agatgcagca gccatctccc ccaattcctc ctgtccatcc 360
tgatgtgcag ttaaaaaatc tgcccttta tgatgtcctt gatgttctca tcaagcccac 420
gagtttagtt caaagcagta ttcagcgatt tcaagagaag ttttttattt ttgctttgac 480
acctcaacaa gttagagaga tatgcatatc cagggatttt ttgccaggtg gtaggagaga 540
ttat                                                                   544
```

```
<210> 430
<211> 507
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(507)
<223> n = A,T,C or G

<400> 430
cttatcncaa tggggctccc aaacttggct gtgcagtgga aactccgggg gaattttgaa 60
gaacactgac acccatcttc caccccgaca ctctgattta attgggctgc agtgagaaca 120
gagcatcaat ttaaaaagct gcccagaatg ttntcctggg cagcgttgtg atctttgccn 180
ccttcgtgac tttatgcaat gcatcatgct atttcatacc taatgaggga gttccaggag 240
attcaaccag gatgtttcta cncctgtggg ttatgacaaa gacaactgcc aaagaatntt 300
caagaaggag gactgcaagt atatcgtggt ggagaagaag gacccaaaaa agacctgttc 360
tgtcagtgaa tggataatct aatgtgcttc tagtaggcac agggctccca ggccaggcct 420
cattctcctc tggcctctaa tagtcaatga ttgtgtagcc atgcctatca gtaaaaagat 480
ttttgagcaa aaaaaaaaaa aaaaaaa                                          507
```

```
<210> 431
<211> 392
```

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(392)
<223> n = A,T,C or G

<400> 431
gaaaattcag aatggataaa aacaaatgaa gtacaaaata tttcagattt acatagcgat 60
aaacaagaaa gcacttatca ggaggactta caaatggaag tacactctan aaccatcatc 120
tatcatggct aaatgtgaga ttagcacagc tgtattattt gtacattgca aacacctaga 180
aagagatggg aaacaaaatc ccaggagttt tgtgtgtgga gtcctgggtt ttccaacaga 240
catcattcca gcattctgag attagggnga ttggggatca ttctggagtt ggaatgttca 300
acaaagtga tgttgttagg taaaatgtac aacttctgga tctatgcaga cattgaaggt 360
gcaatgagtc tggctttac tctgctgttt ct 392

<210> 432
<211> 387
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(387)
<223> n = A,T,C or G

<400> 432
ggtatccnta cataatcaaa tatagctgta gtacatgttt tcattggngt agattaccac 60
aaatgcaagg caacatgtgt agatctcttg tcttattctt ttgtctataa tactgtattg 120
ngtagtccaa gctctcggna gtccagccac tgngaaacat gctcccttta gattaacctc 180
gtggacnctn ttgttgnatt gtctgaactg tagngccctg tattttgctt ctgtctgnga 240
attctgttgc ttctggggca tttccttgng atgcagagga ccaccacaca gatgacagca 300
atctgaattg ntccaatcac agctgcgatt aagacatact gaaatcgtac aggaccggga 360
acaacgtata gaacactgga gtccttt 387

<210> 433
<211> 281
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(281)
<223> n = A,T,C or G

<400> 433
ttcaactagc anagaanact gcttcagggn gtgtaaaatg aaaggcttcc acgcagttat 60
ctgattaaag aacactaaga gagggacaag gctagaagcc gcaggatgtc tacactatag 120
caggcnctat ttgggttggc tggaggagct gtggaaaaca tggagagatt ggcgctggag 180
atcgccgtgg ctattcctcn ttgntattac accagngagg ntctctgtnt gcccactggt 240
tnnaaaaccg ntatacaata atgatagaat aggacacaca t 281

<210> 434
<211> 484

<212> DNA
<213> Homo sapiens

<400> 434
ttttaaaata agcatttagt gctcagtccc tactgagtac tctttctctc ccctcctctg 60
aatttaattc tttcaacttg caatttgcaa ggattacaca tttcactgtg atgtatattg 120
tgttgcaaaa aaaaaaaagt gtctttgttt aaaattactt ggtttgtgaa tccatcttgc 180
tttttcccca ttggaactag tcattaaccc atctctgaac tggtagaaaa acatctgaag 240
agctagtcta tcagcatctg acaggtgaat tggatggttc tcagaaccat ttcacccaga 300
cagcctgttt ctatcctgtt taataaatta gtttgggttc tctacatgca taacaaaccc 360
tgctccaatc tgtcacataa aagtctgtga cttgaagttt agtcagcacc cccaccaaac 420
tttatttttc tatgtgtttt ttgcaacata tgagtgtttt gaaaataaag tacccatgtc 480
ttta   484

<210> 435
<211> 424
<212> DNA
<213> Homo sapiens

<400> 435
gcgccgctca gagcaggtca ctttctgcct tccacgtcct ccttcaagga agccccatgt 60
gggtagcttt caatatcgca ggttcttact cctctgcctc tataagctca aacccaccaa 120
cgatcgggca agtaaacccc ctccctcgcc gacttcggaa ctggcgagag ttcagcgcag 180
atgggcctgt ggggaggggg caagatagat gaggggagc ggcatggtgc ggggtgaccc 240
cttggagaga ggaaaaaggc cacaagaggg gctgccaccg ccactaacgg agatggccct 300
ggtagagacc tttgggggtc tggaacctct ggactcccca tgctctaact cccacactct 360
gctatcagaa acttaaactt gaggattttc tctgtttttc actcgcaata aattcagagc 420
aaac   424

<210> 436
<211> 667
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(667)
<223> n = A,T,C or G

<400> 436
accttgggaa nactctcaca atataaaggg tcgtagactt tactccaaat tccaaaaagg 60
tcctggccat gtaatcctga aagttttccc aaggtagcta taaaatcctt ataagggtgc 120
agcctcttct ggaattcctc tgatttcaaa gtctcactct caagttcttg aaaacgaggg 180
cagttcctga aaggcaggta tagcaactga tcttcagaaa gaggaactgt gtgcaccggg 240
atgggctgcc agagtaggat aggattccag atgctgacac cttctggggg aaacagggct 300
gccaggtttg tcatagcact catcaaagtc cggtcaacgt ctgtgcttcg aatataaacc 360
tgttcatgtt tataggactc attcaagaat tttctatatc tctttcttat atactctcca 420
agttcataat gctgctccat gcccagctgg gtgagttggc caaatccttg tggccatgag 480
gattcctta tggggtcagt gggaaaggtg tcaatgggac ttcggtctcc atgccgaaac 540
accaaagtca caaacttcaa ctccttggct agtacacttc ggtctagcca gaaaaaaagc 600
agaaacaaga agccaaggct aaggcttgct gccctgccag gaggaggggt gcagctctca 660
tgttgag   667

<210> 437
<211> 693

<212> DNA
<213> Homo sapiens

<400> 437
ctacgtctca accctcattt ttaggtaagg aatcttaagt ccaaagatat taagtgactc 60
acacagccag gtaaggaaag ctggattggc acactaggac tctaccatac cgggttttgt 120
taaagctcag gttaggaggc tgataagctt ggaaggaact tcagacagct ttttcagatc 180
ataaaagata attcttagcc catgttcttc tccagagcag acctgaaatg acagcacagc 240
aggtactcct ctattttcac ccctcttgct tctactctct ggcagtcaga cctgtgggag 300
gccatgggag aaagcagctc tctggatgtt tgtacagatc atggactatt ctctgtggac 360
catttctcca ggttaccccta ggtgtcacta ttggggggac agccagcatc tttagctttc 420
atttgagttt ctgtctgtct tcagtagagg aaacttttgc tcttcacact tcacatctga 480
acacctaact gctgttgctc ctgaggtggt gaaagacaga tatagagctt acagtattta 540
tcctatttct aggcactgag ggctgtgggg taccttgtgg tgccaaaaca gatcctgttt 600
taaggacatg ttgcttcaga gatgtctgta actatctggg ggctctgttg gctctttacc 660
ctgcatcatg tgctctcttg gctgaaaatg acc 693

<210> 438
<211> 360
<212> DNA
<213> Homo sapiens

<400> 438
ctgcttatca caatgaatgt tctcctgggc agcgttgtga tctttgccac cttcgtgact 60
ttatgcaatg catcatgcta tttcataacct aatgagggag ttccaggaga ttcaaccagg 120
atgtttctac acctgtgggt tatgacaaag acaactgcca aagaatcttc aagaaggagg 180
actgcaagta tatctggtgg agaagaagga cccaaaaaag acctgttctg tcagtgaatg 240
gataatctaa tgtgcttcta gtaggcacag ggctcccagg ccaggcctca ttctcctctg 300
gcctctaata gtcaataatt gtgtagccat gcctatcagt aaaaagattt ttgagcaaac 360

<210> 439
<211> 431
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(431)
<223> n = A,T,C or G

<400> 439
gttcctnnta actcctgcca gaaacagctc tcctcaacat gagagctgca cccctcctcc 60
tggccagggc agcaagcctt agccttggct tcttgtttct gctttttttc tggctagacc 120
gaagtgtact agccaaggag ttgaagtttg tgactttggt gtttcggcat ggagaccgaa 180
gtcccattga cacctttccc actgaccca taaaggaatc ctcatggcca caaggatttg 240
gccaactcac ccagctgggc atggagcagc attatgaact tggagagtat ataagaaaga 300
gatatagaaa attcttgaat gagtcctata aacatgaaca ggtttatatt cgaagcacag 360
acgttgaccg gactttgatg agtgctatga caaacctggc agcccgtcga cgcggccgcg 420
aatttagtag t 431

<210> 440
<211> 523
<212> DNA
<213> Homo sapiens

<400> 440
agagataaag cttaggtcaa agttcataga gttcccatga actatatgac tggccacaca 60
ggatcttttg tatttaagga ttctgagatt ttgcttgagc aggattagat aaggctgttc 120
tttaaatgtc tgaaatggaa cagatttcaa aaaaaaaccc cacaatctag ggtgggaaca 180
aggaaggaaa gatgtgaata ggctgatggg caaaaaacca atttacccat cagttccagc 240
cttctctcaa ggagaggcaa agaaaggaga tacagtggag acatctggaa agttttctcc 300
actggaaaac tgctactatc tgttttttata tttctgttaa aatatatgag ctacagaac 360
taaaaattaa aacctctttg tgtcccttgg tcctggaaca tttatgttcc ttttaaagaa 420
acaaaaatca aactttacag aaagatttga tgtatgtaat acatatagca gctcttgaag 480
tatatatatc atagcaaata agtcatctga tgagaacaag cta   523

<210> 441
<211> 430
<212> DNA
<213> Homo sapiens

<400> 441
gttcctccta actcctgcca gaaacagctc tcctcaacat gagagctgca cccctcctcc 60
tggccagggc agcaagcctt agccttggct tcttgtttct gctttttttc tggctagacc 120
gaagtgtact agccaaggag ttgaagtttg tgactttggt gtttcggcat ggagaccgaa 180
gtcccattga cacctttccc actgacccca taaaggaatc ctcatggcca caaggatttg 240
gccaactcac ccagctgggc atggagcagc attatgaact tggagagtat ataagaaaga 300
gatatagaaa attcttgaat gagtcctata aacatgaaca ggtttatatt cgaagcacag 360
acgttgaccg gactttgatg agtgctatga caaacctggc agcccgtcga cgcggccgcg 420
aatttagtag   430

<210> 442
<211> 362
<212> DNA
<213> Homo sapiens

<400> 442
ctaaggaatt agtagtgttc ccatcacttg tttggagtgt gctattctaa aagattttga 60
tttcctggaa tgacaattat attttaactt tggtggggga aagagttata ggaccacagt 120
cttcacttct gatacttgta aattaatctt ttattgcact tgttttgacc attaagctat 180
atgtttagaa atggtcattt tacggaaaaa ttagaaaaat tctgataata gtgcagaata 240
aatgaattaa tgtttttactt aatttatatt gaactgtcaa tgacaaataa aaattctttt 300
tgattatttt ttgtttttcat ttaccagaat aaaaactaag aattaaaagt ttgattacag 360
tc   362

<210> 443
<211> 624
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(624)
<223> n = A,T,C or G

<400> 443
ttttttttttt gcaacacaat atacatcaca gtgaaatgtg taatccttgc aaattgcaag 60
ttgaaagaat taaattcaga ggagggggaga gaaagagtac tcagtaggga ctgagcacta 120
aatgcttatt ttaaaagaaa tgtaaagagc agaaagcaat tcaggctacc ctgccttttg 180
tgctggctag tactccggtc ggtgtcagca gcacgtggca ttgaacattg caatgtggag 240

```
cccaaaccac agaaaatggg gtgaaattgg ccaactttct attaacttgg cttcctgttt 300
tataaaatat tgtgaataat atcacctact tcaaagggca gttatgaggc ttaaatgaac 360
taacgcctac aaaacactta aacatagata acataggtgc aagtactatg tatctggtac 420
atggtaaaca tccttattat taaagtcaac gctaaaatga atgtgtgtgc atatgctaat 480
agtacagaga gagggcactt aaaccaacta agggcctgga gggaaggttt cctggaaaga 540
ngatgcttgt gctgggtcca aatcttggtc tactatgacc ttggccaaat tatttaaact 600
ttgtccctat ctgctaaaca gatc                                      624
```

```
<210> 444
<211> 425
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(425)
<223> n = A,T,C or G

<400> 444
gcacatcatt nntcttgcat tctttgagaa taagaagatc agtaaatagt tcagaagtgg 60
gaagctttgt ccaggcctgt gtgtgaaccc aatgttttgc ttagaaatag aacaagtaag 120
ttcattgcta tagcataaca caaaatttgc ataagtggtg gtcagcaaat ccttgaatgc 180
tgcttaatgt gagaggttgg taaaatcctt tgtgcaacac tctaactccc tgaatgtttt 240
gctgtgctgg gacctgtgca tgccagacaa ggccaagctg gctgaaagag caaccagcca 300
cctctgcaat ctgccacctc ctgctggcag gatttgtttt tgcatcctgt gaagagccaa 360
ggaggcacca gggcataagt gagtagactt atggtcgacg cggccgcgaa tttagtagta 420
gtaga                                                           425
```

```
<210> 445
<211> 414
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(414)
<223> n = A,T,C or G

<400> 445
catgtttatg nttttggatt actttgggca cctagtgttt ctaaatcgtc tatcattctt 60
ttctgttttt caaaagcaga gatggccaga gtctcaacaa actgtatctt caagtctttg 120
tgaaattctt tgcatgtggc agattattgg atgtagtttc cttaactag catataaatc 180
tggtgtgttt cagataaatg aacagcaaaa tgtggtggaa ttaccatttg gaacattgtg 240
aatgaaaaat tgtgtctcta gattatgtaa caaataacta tttcctaacc attgatcttt 300
ggattttat aatcctactc acaaatgact aggcttctcc tcttgtattt tgaagcagtg 360
tgggtgctgg attgataaaa aaaaaaaaag tcgacgcggc cgcgaattta gtag      414
```

```
<210> 446
<211> 631
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(631)
```

```
<223> n = A,T,C or G

<400> 446
acaaattaga anaaagtgcc agagaacacc acataccttg tccggaacat tacaatggct 60
tctgcatgca tgggaagtgt gagcattcta tcaatatgca ggagccatct tgcaggtgtg 120
atgctggtta tactggacaa cactgtgaaa aaaaggacta cagtgttcta tacgttgttc 180
ccggtcctgt acgatttcag tatgtcttaa tcgcagctgt gattggaaca attcagattg 240
ctgtcatctg tgtggtggtc ctctgcatca caagggccaa actttaggta atagcattgg 300
actgagattt gtaaactttc caaccttcca ggaaatgccc cagaagcaac agaattcaca 360
gacagaagca aaatacaggg cactacagtt cagacaatac aacaagagcg tccacgaggt 420
taatctaaag ggagcatgtt tcacagtggc tggactaccg agagcttgga ctacacaata 480
cagtattata gacaaaagaa taagacaaga gatctacaca tgttgccttg catttgtggt 540
aatctacacc aatgaaaaca tgtactacag ctatatttga ttatgtatgg atatatttga 600
aatagtatac attgtcttga tgttttttct g                            631


<210> 447
<211> 585
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(585)
<223> n = A,T,C or G

<400> 447
ccttgggaaa antntcacaa tataaagggt cgtagacttt actccaaatt ccaaaaaggt 60
cctggccatg taatcctgaa agttttccca aggtagctat aaaatcctta taagggtgca 120
gcctcttctg gaattcctct gatttcaaag tctcactctc aagttcttga aaacgagggc 180
agttcctgaa aggcaggtat agcaactgat cttcagaaag aggaactgtg tgcaccggga 240
tgggctgcca gagtaggata ggattccaga tgctgacacc ttctggggga aacagggctg 300
ccaggtttgt catagcactc atcaaagtcc ggtcaacgtc tgtgcttcga atataaacct 360
gttcatgttt ataggactca ttcaagaatt ttctatatct ctttcttata tactctccaa 420
gttcataatg ctgctccatg cccagctggg tgagttggcc aaatccttgt ggccatgagg 480
attcctttat ggggtcagtg ggaaaggtgt caatgggact tcggtctcca tgccgaaaca 540
ccaaagtcac aaacttcaac tccttggcta gtacacttcg gtcta                585


<210> 448
<211> 93
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(93)
<223> n = A,T,C or G

<400> 448
tgctcgtggg tcattctgan nnccgaactg accntgccag ccctgccgan gggccnccat 60
ggctccctag tgccctggag aggangggggc tag                          93


<210> 449
<211> 706
<212> DNA
<213> Homo sapiens
```

<220>
<221> misc_feature
<222> (1)...(706)
<223> n = A,T,C or G

<400> 449
ccaagttcat gctntgtgct ggacgctgga cagggggcaa aagcnnttgc tcgtgggtca 60
ttctgancac cgaactgacc atgccagccc tgccgatggt cctccatggc tccctagtgc 120
cctggagagg aggtgtctag tcagagagta gtcctggaag gtggcctctg ngaggagcca 180
cggggacagc atcctgcaga tggtcgggcg cgtcccattc gccattcagg ctgcgcaact 240
gttgggaagg gcgatcggtg cgggcctctt cgctattacg ccagctggcg aaaggggat 300
gtgctgcaag gcgattaagt tgggtaacgc cagggttttc ccagtcncga cgttgtaaaa 360
cgacggccag tgaattgaat ttaggtgacn ctatagaaga gctatgacgt cgcatgcacg 420
cgtacgtaag cttggatcct ctagagcggc cgcctactac tactaaattc gcggccgcgt 480
cgacgtggga tccncactga gagagtggag agtgacatgt gctggacncc gtccatgaag 540
cactgagcag aagctggagg cacaacgcnc cagacactca cagctactca ggaggctgag 600
aacaggttga acctgggagg tggaggttgc aatgagctga gatcaggccn ctgcncccca 660
gcatggatga cagagtgaaa ctccatctta aaaaaaaaaa aaaaaa   706

<210> 450
<211> 493
<212> DNA
<213> Homo sapiens

<400> 450
gagacggagt gtcactctgt tgcccaggct ggagtgcagc aagacactgt ctaagaaaaa 60
acagttttaa aaggtaaaac aacataaaaa gaaatatcct atagtggaaa taagagagtc 120
aaatgaggct gagaacttta caaagggatc ttacagacat gtcgccaata tcactgcatg 180
agcctaagta taagaacaac ctttggggag aaaccatcat ttgacagtga ggtacaattc 240
caagtcaggt agtgaaatgg gtggaattaa actcaaatta atcctgccag ctgaaacgca 300
agagacactg tcagagagtt aaaaagtgag ttctatccat gaggtgattc cacagtcttc 360
tcaagtcaac acatctgtga actcacagac caagttctta aaccactgtt caaactctgc 420
tacacatcag aatcacctgg agagctttac aaactcccat tgccgagggt cgacgcggcc 480
gcgaatttag tag   493

<210> 451
<211> 501
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(501)
<223> n = A,T,C or G

<400> 451
gggcgcgtcc cattcgccat tcaggctgcg caactgttgg gaagggcgat cggtgcgggc 60
ctcttcgcta ttacgccagc tggcgaaagg gggatgtgct gcaaggcgat taagttgggt 120
aacgccaggg ttttcccagt cncgacgttg taaaacgacg gccagtgaat tgaatttagg 180
tgacnctata gaagagctat gacgtcgcat gcacgcgtac gtaagcttgg atcctctaga 240
gcggccgcct actactacta aattcgcggc cgcgtcgacg tgggatccnc actgagagag 300
tggagagtga catgtgctgg acnctgtcca tgaagcactg agcagaagct ggaggcacaa 360
cgcnccagac actcacagct actcaggagg ctgagaacag gttgaacctg ggaggtggag 420
gttgcaatga gctgagatca ggccnctgcn cccagcatg gatgacagag tgaaactcca 480

```
        tcttaaaaaa aaaaaaaaaa a                                       501

        <210> 452
        <211> 51
        <212> DNA
        <213> Homo sapiens

        <220>
        <221> misc_feature
        <222> (1)...(51)
        <223> n = A,T,C or G

        <400> 452
        agacggtttc accnttacaa cnccttttag gatgggnntt ggggagcaag c        51

        <210> 453
        <211> 317
        <212> DNA
        <213> Homo sapiens

        <220>
        <221> misc_feature
        <222> (1)...(317)
        <223> n = A,T,C or G

        <400> 453
        tacatcttgc tttttcccca ttggaactag tcattaaccc atctctgaac tggtagaaaa 60
        acatctgaag agctagtcta tcagcatctg gcaagtgaat tggatggttc tcagaaccat 120
        ttcacccana cagcctgttt ctatcctgtt taataaatta gtttgggttc tctacatgca 180
        taacaaaccc tgctccaatc tgtcacataa aagtctgtga cttgaagttt antcagcacc 240
        cccaccaaac tttatttttc tatgtgtttt ttgcaacata tgagtgtttt gaaaataagg 300
        tacccatgtc tttatta                                             317

        <210> 454
        <211> 231
        <212> DNA
        <213> Homo sapiens

        <400> 454
        ttcgaggtac aatcaactct cagagtgtag tttccttcta tagatgagtc agcattaata 60
        taagccacgc cacgctcttg aaggagtctt gaattctcct ctgctcactc agtagaacca 120
        agaagaccaa attcttctgc atcccagctt gcaaacaaaa ttgttcttct aggtctccac 180
        ccttcctttt tcagtgttcc aaagctcctc acaatttcat gaacaacagc t          231

        <210> 455
        <211> 231
        <212> DNA
        <213> Homo sapiens

        <400> 455
        taccaaagag ggcataataa tcagtctcac agtagggttc accatcctcc aagtgaaaaa 60
        cattgttccg aatgggcttt ccacaggcta cacacacaaa acaggaaaca tgccaagttt 120
        gtttcaacgc attgatgact tctccaagga tcttcctttg gcatcgacca cattcagggg 180
        caaagaattc ctcatagcac agctcacaat acagggctcc tttctcctct a          231
```

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<210> 456
<211> 231
<212> DNA
<213> Homo sapiens

<400> 456
ttggcaggta cccttacaaa gaagacacca taccttatgc gttattaggt ggaataatca 60
ttccattcag tattatcgtt attattcttg gagaaaccct gtctgtttac tgtaaccttt 120
tgcactcaaa ttcctttatc aggaataact acatagccac tatttacaaa gccattggaa 180
ccttttatt tggtgcagct gctagtcagt ccctgactga cattgccaag t          231

<210> 457
<211> 231
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(231)
<223> n = A,T,C or G

<400> 457
cgaggtaccc aggggtctga aaatctctnn tttantagtc gatagcaaaa ttgttcatca 60
gcattcctta atatgatctt gctataatta gatttttctc cattagagtt catacagttt 120
tatttgattt tattagcaat ctctttcaga agacccttga gatcattaag ctttgtatcc 180
agttgtctaa atcgatgcct catttcctct gaggtgtcgc tggcttttgt g          231

<210> 458
<211> 231
<212> DNA
<213> Homo sapiens

<400> 458
aggtctggtt ccccccactt ccactcccct ctactctctc taggactggg ctgggccaag 60
agaagagggg tggttaggga agccgttgag acctgaagcc ccaccctcta ccttccttca 120
acaccctaac cttgggtaac agcatttgga attatcattt gggatgagta gaattccaa 180
ggtcctgggt taggcatttt gggggggccag accccaggag aagaagattc t          231

<210> 459
<211> 231
<212> DNA
<213> Homo sapiens

<400> 459
ggtaccgagg ctcgctgaca cagagaaacc ccaacgcgag gaaaggaatg gccagccaca 60
ccttcgcgaa acctgtggtg gcccaccagt cctaacggga caggacagag agacagagca 120
gccctgcact gttttccctc caccacagcc atcctgtccc tcattggctc tgtgctttcc 180
actatacaca gtcaccgtcc caatgagaaa caagaaggag caccctccac a          231

<210> 460
<211> 231
<212> DNA
<213> Homo sapiens

<400> 460
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gcaggtataa catgctgcaa caacagatgt gactaggaac ggccggtgac atggggaggg 60
cctatcaccc tattcttggg ggctgcttct tcacagtgat catgaagcct agcagcaaat 120
cccacctccc cacacgcaca cggccagcct ggagcccaca gaagggtcct cctgcagcca 180
gtggagcttg gtccagcctc cagtccaccc ctaccaggct taaggataga a           231
```

<210> 461
<211> 231
<212> DNA
<213> Homo sapiens

<400> 461
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cgaggtttga gaagctctaa tgtgcagggg agccgagaag caggcggcct agggagggtc 60
gcgtgtgctc cagaagagtg tgtgcatgcc agaggggaaa caggcgcctg tgtgtcctgg 120
gtggggttca gtgaggagtg ggaaattggt tcagcagaac caagccgttg ggtgaataag 180
aggggggattc catggcactg atagagccct atagtttcag agctgggaat t           231
```

<210> 462
<211> 231
<212> DNA
<213> Homo sapiens

<400> 462
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aggtaccctc attgtagcca tgggaaaatt gatgttcagt ggggatcagt gaattaaatg 60
gggtcatgca agtataaaaa ttaaaaaaaa aagacttcat gcccaatctc atatgatgtg 120
gaagaactgt tagagagacc aacagggtag tgggttagag atttccagag tcttacattt 180
tctagaggag gtatttaatt tcttctcact catccagtgt tgtatttagg a           231
```

<210> 463
<211> 231
<212> DNA
<213> Homo sapiens

<400> 463
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tactccagcc tggtgacaga gcgagaccct atcaccgccc cccaccccac caaaaaaaaa 60
actgagtaga caggtgtcct cttggcatgg taagtcttaa gtcccctccc agatctgtga 120
catttgacag gtgtcttttc ctctggacct cggtgtcccc atctgagtga gaaaaggcag 180
tggggaggtg gatcttccag tcgaagcggt atagaagccc gtgtgaaaag c           231
```

<210> 464
<211> 231
<212> DNA
<213> Homo sapiens

<400> 464
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gtactctaag attttatcta agttgccttt tctgggtggg aaagtttaac cttagtgact 60
aaggacatca catatgaaga atgtttaagt tggaggtggc aacgtgaatt gcaaacaggg 120
cctgcttcag tgactgtgtg cctgtagtcc cagctactcg ggagtctgtg tgaggccagg 180
ggtgccagcg caccagctag atgctctgta acttctaggc cccattttcc c           231
```

<210> 465
<211> 231
<212> DNA
<213> Homo sapiens

<400> 465
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catgttgttg tagctgtggt aatgctggct gcatctcaga cagggttaac ttcagctcct 60
gtggcaaatt agcaacaaat tctgacatca tatttatggt ttctgtatct ttgttgatga 120
aggatggcac aatttttgct tgtgttcata atatactcag attagttcag ctccatcaga 180
taaactggag acatgcagga cattagggta gtgttgtagc tctggtaatg a          231
```

```
<210> 466
<211> 231
<212> DNA
<213> Homo sapiens
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<400> 466
caggtacctc tttccattgg atactgtgct agcaagcatg ctctccgggg ttttttttaat 60
ggccttcgaa cagaacttgc cacatacccca ggtataatag tttctaacat ttgcccagga 120
cctgtgcaat caaatattgt ggagaattcc ctagctggag aagtcacaaa gactataggc 180
aataatggag accagtcccca caagatgaca accagtcgtt gtgtgcggct g          231
```

```
<210> 467
<211> 311
<212> DNA
<213> Homo sapiens
```

```
<400> 467
gtacaccctg gcacagtcca atctgaactg gttcggcact catctttcat gagatggatg 60
tggtggcttt tctcctttt catcaagact cctcagcagg gagcccagac cagcctgcac 120
tgtgccttaa cagaaggtct tgagattcta agtgggaatc atttcagtga ctgtcatgtg 180
gcatgggtct ctgcccaagc tcgtaatgag actatagcaa ggcggctgtg ggacgtcagt 240
tgtgacctgc tgggcctccc aatagactaa caggcagtgc cagttggacc caagagaaga 300
ctgcagcaga c                                                       311
```

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<210> 468
<211> 3112
<212> DNA
<213> Homo sapiens
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<400> 468
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aagatctgca tggtgggaag gacctgatga tacagagttt gataggagac aattaaaggc 120
tggaaggcac tggatgcctg atgatgaagt ggactttcaa actggggcac tactgaaacg 180
atgggatggc cagagacaca ggagatgagt tggagcaagc tcaataacaa agtggttcaa 240
cgaggacttg gaattgcatg gagctggagc tgaagtttag cccaattgtt tactagttga 300
gtgaatgtgg atgattggat gatcatttct catctctgag cctcaggttc cccatccata 360
aaatgggata cacagtatga tctataaagt gggatatagt atgatctact tcactgggtt 420
atttgaagga tgaattgaga taatttattt caggtgccta gaacaatgcc cagattagta 480
catttggtgg aactgagaaa tggcataaca ccaaatttaa tatatgtcag atgttactat 540
gattatcatt caatctcata gttttgtcat ggcccaattt atcctcactt gtgcctcaac 600
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tttccattcc agttggcttc ttgggtttgc tagctgcatc actagtcatc ttaaataaat 720
gaagttttaa catttctcca gtgatttttt tatctcacct ttgaagatac tatgttatgt 780
gattaaataa agaacttgag aagaacaggt ttcattaaac ataaaatcaa tgtagacgca 840
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attaaatggc aatggacaaa gtgaaaaact tagacttttt ttttttttt ggaagtatct 960
ggatgttcct tagtcactta aaggagaact gaaaaatagc agtgagttcc acataatcca 1020
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tccaaagcca acgtcgaatt ttgaaacata tcaaagctct tcttcaagac aaataatcta 1140
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tttagctctc aaaatggttc attttaagag aaagttttag aatctcatat ttattcctgt 1260
ggaaggacag cattgtggct tggactttat aaggtcttta ttcaactaaa taggtgagaa 1320
ataagaaagg ctgctgactt taccatctga ggccacacat ctgctgaaat ggagataatt 1380
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ccgcttgtga gggaaggaca ttagaaaatg aattgatgtg ttccttaaag gatgggcagg 1620
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atcatttcat atttctaacc ctcaaaacaa agctgttgta atatctgatc tctacggttc 1920
cttctgggcc caacattctc catatatcca gccacactca ttttttaatat ttagttccca 1980
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gatctgtgaa caggctggga agcatctcaa gatctttcca gggttatact tactagcaca 2160
cagcatgatc attacggagt gaattatcta atcaacatca tcctcagtgt ctttgcccat 2220
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gcaaatacta aaagtgtaat ttgattataa gagtttagat aaatatatga aatgcaagag 2760
ccacagaggg aatgtttatg gggcacgttt gtaagcctgg gatgtgaagc aaaggcaggg 2820
aacctcatag tatcttatat aatatacttc atttctctat ctctatcaca atatccaaca 2880
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tgagtgcgct ttagaatttt ggcaaatcat actggtcact tatctcaact ttgagatgtg 3000
tttgtccttg tagttaattg aaagaaatag ggcactcttg tgagccactt tagggttcac 3060
tcctggcaat aaagaattta caaagagcaa aaaaaaaaaa aaaaaaaaa aa       3112
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<210> 469
<211> 2229
<212> DNA
<213> Homo sapiens


<400> 469
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tgatttgcca aaattctaaa gcgcactcac catgaaatgg ataaaggtta cctttgggga 180
tttgcactgc atgaattctg tgaaaagctt gttggatatt gtgatagaga tagagaaatg 240
aagtatatta tataagatac tatgaggttc cctgcctttg cttcacatcc caggcttaca 300
aacgtgcccc ataaacattc cctctgtggc tcttgcattt catatattta tctaaactct 360
tataatcaaa tacactttta gtatttgctg tctcatgtga tgatgaatct catatgtgtc 420
ccttctttgc atgaagtaag atagtcaact tattcaaaac tttacatcat tctagattta 480
agagacaagg aagagcttct caggcagaag gaataatgta tgcctgacat gttcaaggaa 540
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tttatactgg aaaaaaaatc aaacaaaggg gagggataaa ggacttagtc atctttgcac 720
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ttaaaaaaaa agttaatcct gtgatattaa tggaatgaca ttttgaggtc ttgagaatgg 840
gcacaaaagt gggaaatgaa tttcagtatg ggcaaagaca ctgaggatga tgttgattag 900
ataattcact ccgtaatgat catgctgtgt gctagtaagt ataaccctgg aaagatcttg 960
```

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cagtgtagaa aggtcacagt acagatctgg gaactaaata ttaaaaatga gtgtggctgg 1140
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<210> 470
<211> 2426
<212> DNA
<213> Homo sapiens

<400> 470
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caaaattcta aagcgcactc accatgaaat ggataaaggt tacctttggg gatttgcact 180
gcatgaattc tgtgaaaagc ttgttggata ttgtgataga gatagagaaa tgaagtatat 240
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aattacactt ttagtatttg ctgtctcatg tgatgatgaa tctcatatgt gtcccttctt 420
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atgtccttcc ctcacaagcg ggaccaggca caggcgagg ctcatcgatg acccaagatg 1560
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gcggccgggc atttctccca gggatctctg tgcttccttt tgtgcttcct gtgtgtgtgg 1620
atatttaaag gggctggaaa tgtgcaaaaa catgtcacta cttagacatt atattgtcat 1680
cttgctgttt ctagtgatgt taattatctc catttcagca gatgtgtggc ctcagatggt 1740
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tcctttaagg aacacatcaa ttcatttct aatgtccttc cctcacaagc gggaccaggc 480
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ccatttcagc agatgtgtgg cctcagatgg taaagtcagc agcctttctt atttctcacc 720
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caatcaggat attgaacctg acaagagag agaaggaaca cctccgatcg aagaacgtaa 240
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ctctgatgta aaagagaaga ctccacctaa tcctaagcat gctaagacta aagaagcagg 360
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cattgaaaat gtgactgaaa atttgaaaat tctctcaata aagtttgagt tttctctgaa 480
gaaaaaaaaa naaaaaaaaa aaanaaaaan aaaaa                              515
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PCT

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classificati n [7] : C12N 15/12, C07K 14/47, C12Q 1/68, A61K 39/395, G01N 33/68, 33/574, C07K 16/30, C12N 15/62, 5/02 // A61P 35/00	A3	(11) Internati nal Publicati n Number: **WO 00/04149** (43) Internati nal Publication Date: 27 January 2000 (27.01.00)

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09/232,149	15 January 1999 (15.01.99)	US
09/288,946	9 April 1999 (09.04.99)	US

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(74) Agents: MAKI, David, J. et al.; Seed and Berry LLP, 6300 Columbia, 701 Fifth Avenue, Seattle, WA 98104-7092 (US).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

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(54) Title: COMPOSITIONS AND METHODS FOR THERAPY AND DIAGNOSIS OF PROSTATE CANCER

(57) Abstract

Compositions and methods for the therapy and diagnosis of cancer, such as prostate cancer, are disclosed. Compositions may comprise one or more prostate tumor proteins, immunogenic portions thereof, or polynucleotides that encode such portions. Alternatively, a therapeutic composition may comprise an antigen presenting cell that expresses a prostate tumor protein, or a T cell that is specific f r cells expressing such a protein. Such compositions may be used, for example, for the prevention and treatment of diseases such as prostate cancer. Diagnostic methods based on detecting a prostate tumor protein, or mRNA encoding such a protein, in a sample are also provided.

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7   C12N15/12   C07K14/47   C12Q1/68   A61K39/395   G01N33/68
G01N33/574   C07K16/30   C12N15/62   C12N5/02
//A61P35/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7   C12N   C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category°	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97 33909 A (CORIXA CORP) 18 September 1997 (1997-09-18) the whole document ---	1-22, 29-31, 35-49, 53-79
A	SJOGREN H O: "Therapeutic immunization against cancer antigens using genetically engineered cells" IMMUNOTECHNOLOGY, vol. 3, no. 3, 1 October 1997 (1997-10-01), pages 161-172, XP004097000 ISSN: 1380-2933 the whole document --- -/--	23-28, 32-34, 53-57

[X] Further documents are listed in the continuation of box C.   [X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 January 2000	04.05.00

| Name and mailing address of the ISA
 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016 | Authorized officer

 ANDRES S.M. |

Form PCT/ISA/210 (second sheet) (July 1992)

page 1 of 2

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CHU R S ET AL: "CPG OLIGODEOXYNUCLEOTIDES ACT AS ADJUVANTS THAT SWITCH ON T HELPER 1 (TH1) IMMUNITY" JOURNAL OF EXPERIMENTAL MEDICINE, vol. 186, no. 10, 1 November 1997 (1997-11-01), pages 1623-1631, XP002910130 ISSN: 0022-1007 the whole document	14-20, 25-27, 41-47
A	EP 0 317 141 A (BECTON DICKINSON CO) 24 May 1989 (1989-05-24) the whole document	50-52
A	ZITVOGEL L ET AL: "Eradication of established murine tumors using a novel cell-free vaccine: dendritic cell-derived exosomes" NATURE MEDICINE, vol. 4, no. 5, 1 May 1998 (1998-05-01), pages 594-600, XP002085387 ISSN: 1078-8956 cited in the application	
P,X	WO 98 37093 A (CORIXA CORP) 27 August 1998 (1998-08-27) page 3, line 20 -page 22, line 2 page 35, line 9 - last line page 76, line 34 -page 78, line 22 claims	1-15, 17-19, 21,22, 29-31, 34,35, 39-42, 44-46, 48,49, 58-79
P,X	WO 98 37418 A (CORIXA CORP) 27 August 1998 (1998-08-27) page 2 -page 24 example 2 page 35, line 15 -page 36, line 11 page 81, line 14 -page 83, line 11 claims	1-15, 17-19, 21,22, 29-31, 34,35, 39-42, 44-46, 48,49, 58-79

INTERNATIONAL SEARCH REPORT

B x I Ob ervations where certain claim were found unsearchable (C ntinuation f lt m 1 of first he t)

This International Search Report has not been established in respect of certain claim under Article 17(2)(a) for the foll wing reasons:

1. **[X]** Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

   Remark: Although claims 29-34, 48-49, 52, 55-57
   are directed to a method of treatment of the human/animal
   body, the search has been carried out and based on the alleged
   effects of the compound/composition.

2. **[ ]** Claims Nos.:
   because they relate to parts of the International Application that do not comply with the prescribed requirements to such
   an extent that no meaningful International Search can be carried out, specifically:

3. **[ ]** Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

   see additional sheet

1. **[ ]** As all required additional search fees were timely paid by the applicant, this International Search Report covers all
   searchable claims.

2. **[ ]** As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment
   of any additional fee.

3. **[ ]** As only some of the required additional search fees were timely paid by the applicant, this International Search Report
   covers only those claims for which fees were paid, specifically claims Nos.:

4. **[X]** No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is
   restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

   1-79 all partially

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1998)

....

Invention 1. Claims: 1-79 (all partially)

A polypeptide comprising at least an immunogenic portion
of a prostate tumor protein defined as SEQ ID 108 and which
is encoded by the related SEQ IDs 2,3,107 (according to the
Description of the Sequence Identifiers), fragments and
variants thereof, fusion proteins comprising it,
polynucleotides or oligonucleotides derived therefrom,
antibodies or fragments thereof binding to the polypeptide,
pharmaceutical compositions or vaccines comprising these
products and their use in methods for inhibiting, monitoring
or diagnosing the development of a prostate cancer, for
removing tumor cells from a sample or for expanding and/or
stimulating T-cells.

Inventions 2. to 439. Claims: 1-79 (all partially and as
                                    far as applicable)

As for subject 1. but concerning respectively SEQ IDs
1,4-106,109-111,115-171,173-175,177,179-305,307-315,326,328,
330,332-335,340-375,381,382 and 384-472.

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
WO 9733909	A	18-09-1997	AU	2329597	A	01-10-1997
			BR	9708082	A	27-07-1999
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EP 0317141	A	24-05-1989	US	5041289	A	20-08-1991
			AT	108659	T	15-08-1994
			DE	3850745	D	25-08-1994
			DE	3850745	T	24-11-1994
			ES	2059537	T	16-11-1994
			JP	2002345	A	08-01-1990
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			NO	994069	A	22-10-1999
			ZA	9801585	A	04-09-1998
WO 9837418	A	27-08-1998	AU	6536898	A	09-09-1998
			EP	0972201	A	19-01-2000
			ZA	9801536	A	08-01-1999

BNSDOCID: <WO___0004149A3_I_>